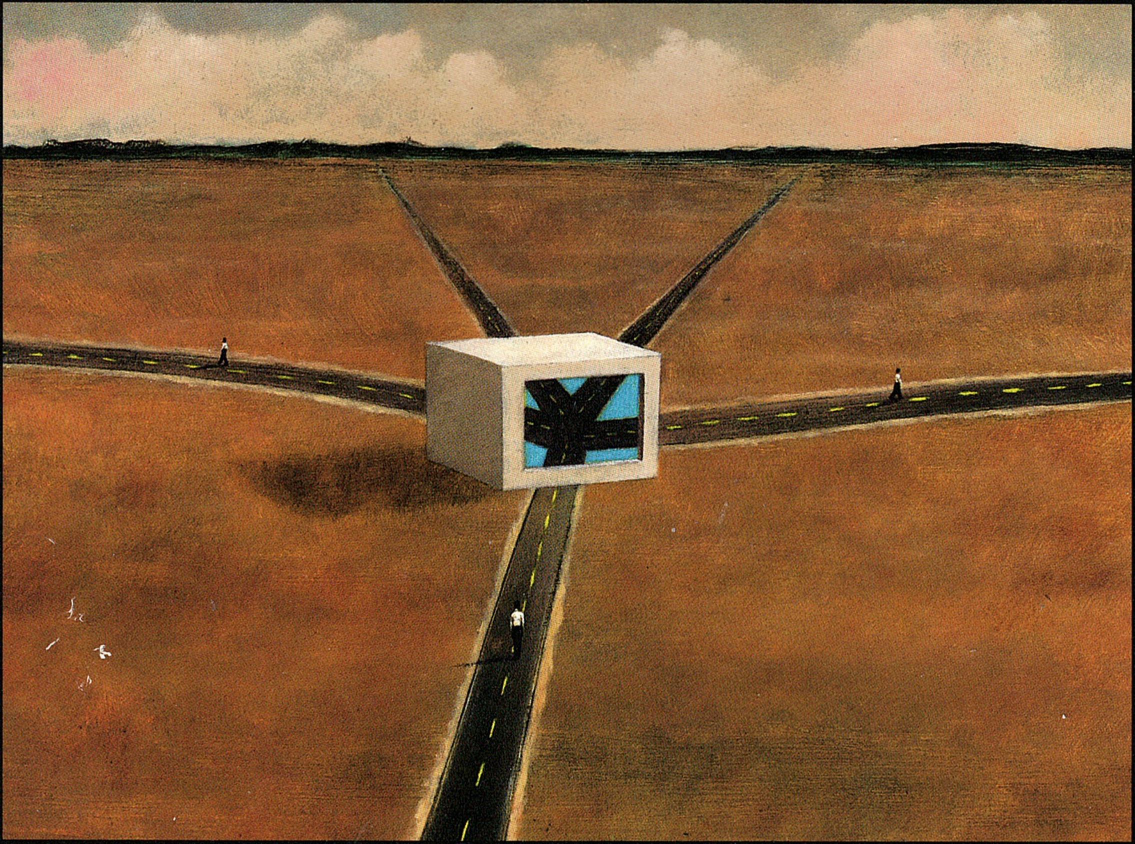
Farallon®

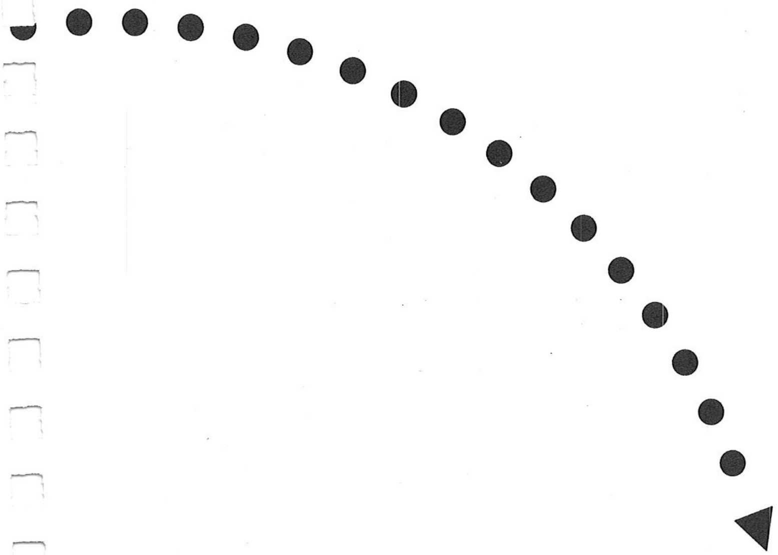
PhoneNET StarController®



PhoneNET

System™

Farallon® StarController® User's Guide



Farallon Computing, Inc.

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Patents

StarController technology is covered by U.S. Patents Number 4,943,979 and 5,119,398. Other patents and design patent are pending.

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Credits

StarController design and engineering by Hal Webber. Firmware by David J. Oroshnik.

User guide written and formatted by Ron Schmidt. Edited by Diana Wynne, Jeff Swartz, and Fred Kaye. Illustrated by Tenley Wicks and Ilene Sandler. Special thanks to Rob Stein, Brad Adams, Katie Kenny, David Oroshnik, Chris Weigant, Doc Kampman, and Zig Zichterman.

Colophon

This manual was created using a Macintosh IIcx computer, Aldus PageMaker, and Adobe Illustrator. Proofs were printed on a LaserWriter II NT, and camera-ready art was produced on a Linotronic 300.

Note to StarController 207 and 307 users

The StarController/12™ (PN357) and StarController/24™ (PN377) hubs offer the reliability and basic functions of the StarController 307. For the most part, the installation steps for the new hubs are the same as for the 307 hub. Here is a summary of the differences:

- **New firmware functionality.** The firmware in the new hubs makes them network-visible devices, and management gateways. The new hubs have an AppleTalk node name and address, and can therefore be managed by StarCommand™ over AppleTalk. The new hubs can translate StarCommand controls from AppleTalk to the management bus, so you can manage StarController/12 and /24 hubs as well as older hubs over AppleTalk. For more details, see "New Features of the StarController/12 and /24 Hubs" in the Introduction.
- **Revised pin assignments for the 377 hub.** Pin assignments for a punchdown block attached to a StarController/24 hub have been revised. Since the StarController/24 hub has 24 ports, the previously unused pin rows on the punchdown block are now occupied by ports 13–24. For more details, see "Identify the Pins on a Network Punchdown Block," in Chapter 3.
- **Management bus wiring variations.** Because the new hubs can be managed by a StarController over AppleTalk, you don't have to wire the management bus for StarController/12 and /24 hubs. We still recommend that you install the management bus to ensure that you can control all hubs if the AppleTalk connection fails. See "Variations on Management Bus Wiring" in Chapter 4 for details.
- **Additional LEDs for the 377 hub.** The StarController/24 hub has 12 additional LEDs because it has 12 more ports. For more details, see "LEDs" in Chapter 5.

The StarController package also includes an updated version of StarCommand software. StarCommand 3.0 controls all Farallon hubs, including models 207, 307, 357, 377, 407, and 507. StarCommand 3.0 was entirely redesigned and rewritten to incorporate feedback gathered from many users.

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Introduction

The StarController® hub is a powerful hardware device that lets you create a large LocalTalk network over twisted-pair wiring. You can interconnect multiple StarController hubs to create networks with hundreds or even thousands of devices. The StarController is part of the PhoneNET® family of network products.

Farallon Customer Service

Farallon Computing is committed to providing its customers with reliable products and documentation, backed up with excellent technical support.

Before contacting Farallon Customer Service, look in this user's guide for a solution to your problem. Check the index for a reference to the topic of concern. More information on Farallon Customer Service and Technical Support is found in Appendix T, "Farallon Technical Support."

About the StarController

The Series 300 hubs share the same basic functionality:

- LocalTalk signals are amplified and repeated over each port.
- Ports can be switched on and off with StarCommand, and port settings are remembered after power failures.
- A port is auto-partitioned (temporarily shut off) if an excessively long packet transmission or excessive fragments on that port are detected.
- The Port Interconnect setting can be switched on and off with StarCommand. This setting controls a port's tolerance to fragments and jams.
- Traffic and error counters are continually updated for each port, and this information can be viewed with StarCommand.
- The line quality of network branch wiring can be tested using StarCommand.
- LEDs on the hub help you monitor the traffic and error activity on the ports.
- StarController hubs accommodate flexible network design. Because you can use installed telephone wiring, you can easily add or move devices such as computers, printers, and file servers as your needs change.
- StarController hubs let you easily extend the range of your network. Each StarController has 12 or 24 ports, each of which can support up to 3000 feet (900 meters) of cabling.

For a list of new features of the 357 and 377 hubs, see "New Features of the StarController/12 and /24 Hubs" later in the Introduction.

About this manual

This manual is divided into five chapters and includes five appendixes, a glossary, and an index.

Chapter 1, "Installation Overview," describes the steps necessary to create a network with a StarController.

Chapter 2, "Network Planning," explains some important considerations when designing and planning a network and provides the foundation for building reliable, easily managed networks.

Chapter 3, "Installing and Wiring," shows you how to install the components of a StarController network. It tells you in detail how to install the StarController, wire wall jacks, and configure the management bus.

Chapter 4, "Interconnecting StarController Hubs," shows you how to interconnect StarController hubs in a backbone or hierarchy. It also tells you when you need to terminate the management port and port 12, and when you need to switch Port Interconnect on and off.

Chapter 5, "Using the StarController," describes what happens when you power on the StarController and how to interpret the LEDs.

Appendix A, "Technical Specifications," outlines hardware and firmware specifications.

Appendix B, "Pin Assignments," shows pin assignments for three of the cables used with the StarController and the RJ-21 pin numbers.

Appendix C, "Connecting a Patch Panel or Harmonica Block," shows how to configure a StarController with either of these distribution blocks.

Appendix D, "StarController Series 300 Hubs and the Farallon Concentrator," shows how to convert stand-alone hubs into plug-in units for the Farallon Concentrator.

Appendix T, "Farallon Technical Support," provides information on how to contact Farallon Technical Support.

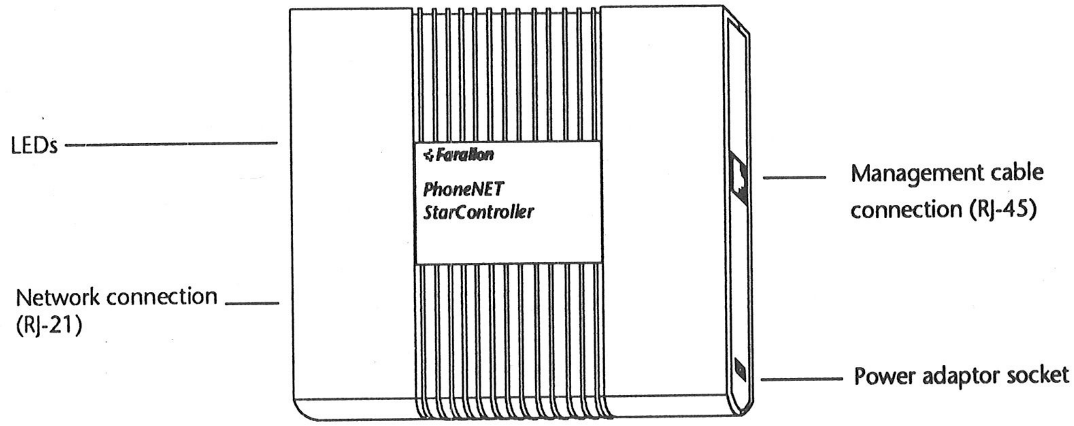
The StarController package

In addition to this manual, the StarController package includes:

- A StarController hub. The StarController is a multi-port repeater with built-in management capabilities.
- A power adaptor for 120 volts (included in packages shipped within the U.S. and Canada).
- A mounting plate to mount the StarController on the wall in the wiring closet.
- A template to mark the correct location of the mounting plate.
- A management cable for attaching the network manager's Macintosh to a StarController.
- The StarCommand disk, which contains StarCommand network management software.
- The *StarCommand User's Guide*, which describes how to install and use the StarCommand software to manage and troubleshoot the network.
- 48 standard 120-ohm terminating resistors. Use these resistors to terminate a wall jack, a StarController port, or the management bus.
- A registration card. Please take a moment now to fill out your registration card so we can notify you about any relevant updated product information.

The StarController

The StarController consists of a circuit board in a molded plastic case.


LEDs
Network connection (RJ-21)
Farallon
PhoneNET StarController
Management cable connection (RJ-45)
Power adaptor socket

The StarController hub

- LEDs. Twelve LEDs indicate the activity and status of the ports, and four LEDs describe the status of the StarController.

  StarController/24 hub: This hub has an additional 12 LEDs to indicate the activity and status of ports 13-24.

- RJ-21 connector. This connector is used to attach the StarController to a punchdown block, patch panel, or harmonica block.
- Management cable connection (RJ-45). You can connect the network manager's Macintosh to this connection using the management cable included in the package.
- Power adaptor socket. Plug the power supply into this socket.

New features of StarController/12 and /24 hubs

The primary difference between the StarController/12 and /24 hubs and all other model hubs is that the new hubs can be managed over AppleTalk because they are network-visible devices. These hubs can also act as management gateways.

The StarController/12 and /24 hubs are **network-visible devices,** meaning that they have an AppleTalk node name and address. The new hubs can be managed via a dedicated pair of wires, known as the management bus, or via AppleTalk. The new hubs interpret StarCommand controls sent over the management bus or sent over AppleTalk.

Other models of hubs (207, 307, 407, and 507 hubs) do not have an AppleTalk node name or address and are transparent to the network. These dedicated management hubs can be managed via the management bus only.

The StarController/12 and /24 hubs can act as **management gateways**, meaning that they can translate StarCommand controls from AppleTalk to the management bus. The StarController/12 and /24 hubs interpret StarCommand controls sent over AppleTalk and forward the controls to any hubs attached via management bus.

Dedicated management hubs interpret StarCommand controls sent via the management bus only. It is possible to manage dedicated management hubs over the network by attaching the management bus from the dedicated management hubs to a StarController/12 or /24 hub, since these hubs act as management gateways.

The new features of StarController/12 and StarController/24 hubs are summarized as follows:

Node and socket numbers
Like other AppleTalk devices, the new hubs are assigned node and socket numbers when they are switched on. The node and socket numbers can be viewed using StarCommand or with network diagnostic software such as CheckNET® or TrafficWatch® II.

Node name
You can assign a node name to a StarController/12 or /24 hub. This name makes it easy to identify StarController/12 and /24 hubs on the network. Node names are entered with StarCommand and are stored in the hub.

Reprogrammability
The new hubs can be updated without replacing any hardware components. StarCommand includes a feature to download a new firmware program into these hubs. Updates can be done over the network. This feature allows you to easily update your hubs should Farallon add functions to the hubs in the future.

Password
If you assign a password to a StarController/12 or /24 hub with StarCommand, users can view hub and port details and settings, but they cannot change them. This prevents unauthorized personnel from inadvertently disrupting the network. Passwords are entered with StarCommand and are stored in the hub.

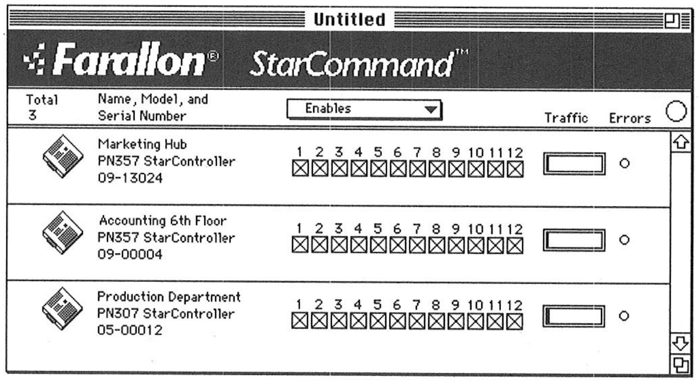
Management gateway functionality
The new hubs translate StarCommand controls from AppleTalk to the management bus. In other words, the StarController/12 and /24 hubs interpret StarCommand controls sent over AppleTalk and forward the controls to any hubs attached to the management bus.

AppleTalk information detection
The new hubs can read the node name, type, zone, and address for devices attached to each port. You can view this information with StarCommand.

Two-way management
You can run StarCommand and control hubs via the management bus or over the network. We recommend that you connect the management bus to the network manager's Macintosh to ensure that you can control the hubs even if the AppleTalk connection fails.

StarCommand

The StarCommand disk provided with the StarController contains the StarCommand application. Use StarCommand to manage and troubleshoot the network. Although you can use the StarController without installing StarCommand, we recommend that you take advantage of the capabilities of the application. StarCommand is described in the *StarCommand User's Guide.*



Total
3

Name, Model, and
Serial Number

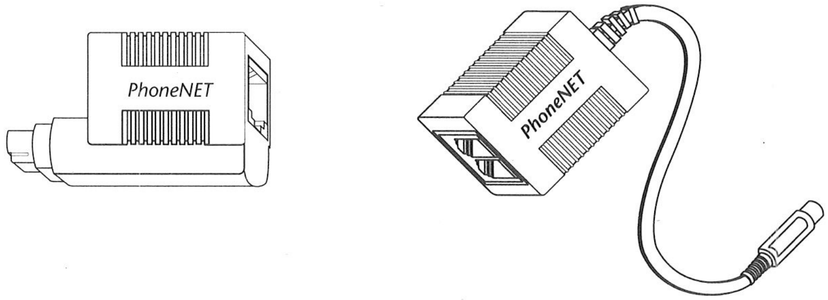
Marketing Hub
PN357 StarController
09-13024

Accounting 6th Floor
PN357 StarController
09-00004

Production Department
PN307 StarController
05-00012

StarConnector and PhoneNET connector

You can use a StarConnector™ or PhoneNET® connector to attach a Macintosh or other AppleTalk device to network wiring. The StarConnector is internally terminated and is easy to install at the end of a network branch. The two-hole PhoneNET connector allows more flexibility; for example, you can daisy-chain a second device from a PhoneNET connector. You can purchase these connectors from your Farallon dealer.



A StarConnector and PhoneNET connector

Chapter 1

Installation Overview

This chapter provides an overview of the steps required to install a basic LocalTalk network with a single StarController. These steps are described in more detail in Chapters 2 and 3.

Here is a summary of the StarController installation steps:

☐ **Learn how the components of the network fit together with the StarController.**
The diagrams in this chapter show the basic components of a StarController network.

☐ **Plan your network.**
Network planning is an important step in installing a network that meets your current needs and can be maintained and expanded over time. Begin by making a detailed network map and doing some research. Chapter 2, “Planning Your Network,” discusses topologies and provides some hints when designing a network. Consider calling Farallon Technical Support at (510) 596-9000 to discuss your network plan *before* you start installation.

☐ **Purchase the necessary equipment.**
In addition to the StarController package, you will need wall jacks, PhoneNET connectors or StarConnector devices, installation tools, and a StarController wiring kit with a punchdown block, harmonica block, or patch panel. All of these components are available from Farallon. The PhoneNET StarController Wiring Kit (Punchdown Block) includes a custom network punchdown block.

☐ **Identify unused wire pairs in the wiring closet.**
If your wiring closet uses distribution punchdown blocks, you need to identify one wire pair going to each office to use for the network. If you do not have an unused wire pair going to each office, install new wiring. We recommend using 2- or 4-pair 22- or 24-gauge, unshielded twisted-pair wire. This wire is available from Farallon.

☐ **Install an RJ-11 wall jack in each office.**
Install a wall jack near each workstation. Wire pin numbers 2 and 5. To ensure that your network operates reliably, terminate each network branch. If you are not planning to use an internally terminated StarConnector or a PhoneNET connector with an RJ-11-mounted terminating resistor, then install a terminating resistor in each wall jack.

☐ **Install the StarController and network punchdown block in the wiring closet.**
Install the StarController and network punchdown block. This punchdown block is used to attach network wiring to the ports of the StarController. Connect the StarController to the network punchdown block using the RJ-21 cable.

☐ **Cross-connect the distribution punchdown block and network punchdown block.**
Wire pairs on the distribution punchdown block should lead to individual RJ-11 wall jacks. Use cross-connect wires to join the distribution punchdown block with the proper pins on the network punchdown block.

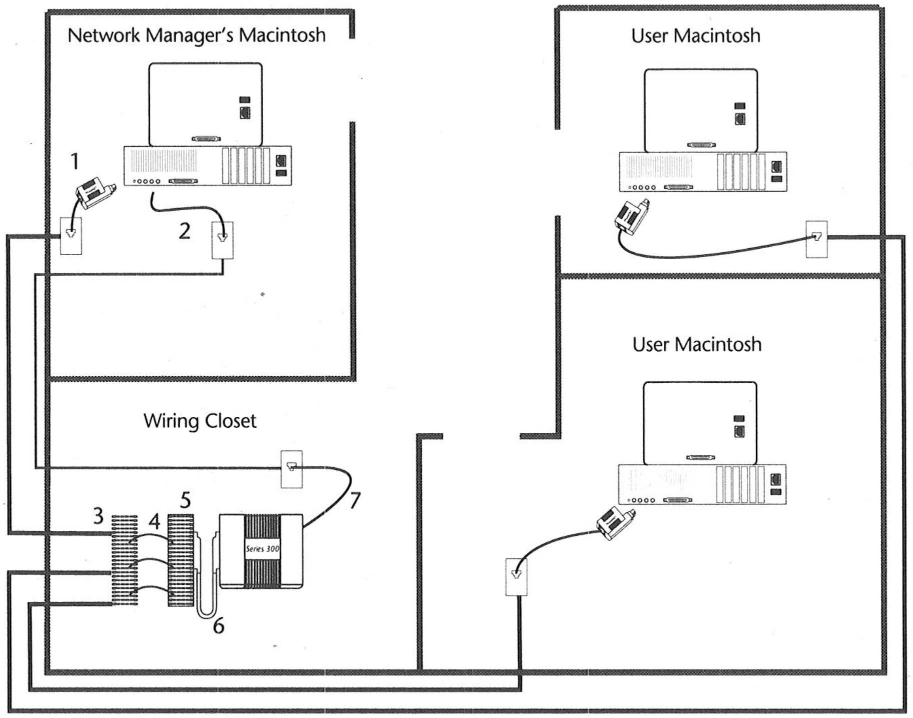
For maximum reliability and manageability, attach one network branch per StarController port and one device per network branch. The actual maximum number of branches and devices you can attach to a single StarController is primarily limited by traffic. We recommend attaching no more than 4 branches per port, and no more than 48 devices per StarController. Place heavily used network devices such as printers and file servers on their own ports.

☐ **Connect a PhoneNET connector or StarConnector to each network device.**
Each PhoneNET connector or StarConnector includes an RJ-11 cable to connect to a wall jack.

☐ **Connect the network manager's Macintosh.**
The StarController package includes a management cable to connect the network manager's Macintosh to the RJ-45 management cable connection on the StarController. You may want to install an RJ-45 wall jack near the network manager's Macintosh and extend the management cable to it. Now you can run StarCommand to manage and troubleshoot your network.

A network with one StarController

The following diagram shows the main components of a single StarController connection.



1. The PhoneNET connector or StarConnector is plugged into the printer port on a Macintosh or the AppleTalk port on another device.
2. The management cable connects the network manager's Macintosh to an RJ-45 jack.
3. Wires coming from office wall jacks are connected to pins on the distribution punchdown block.
4. Wires are cross-connected from the network punchdown block to the distribution punchdown block.
5. Pins on the network punchdown block correspond to ports on the StarController.
6. The RJ-21 cable connects the StarController to the network punchdown block.
7. The management link extension cable connects management port on the StarController to an RJ-45 jack.

Chapter 2

Network Planning

An efficient network that will serve your long-term needs requires thorough research and planning. This chapter discusses some of the topics that are important in the early stages of network development. You should read this chapter to get an overview of the details involved in planning your network. You may consider calling Farallon Technical Support or investing in a consultant to help you design your network.

Every network offers unique constraints and requirements. If you plan to install a small network with a few devices in one room, you may find this chapter has all the information you need. If you plan to implement a large network with hundreds of devices, this chapter may serve only as a starting point.

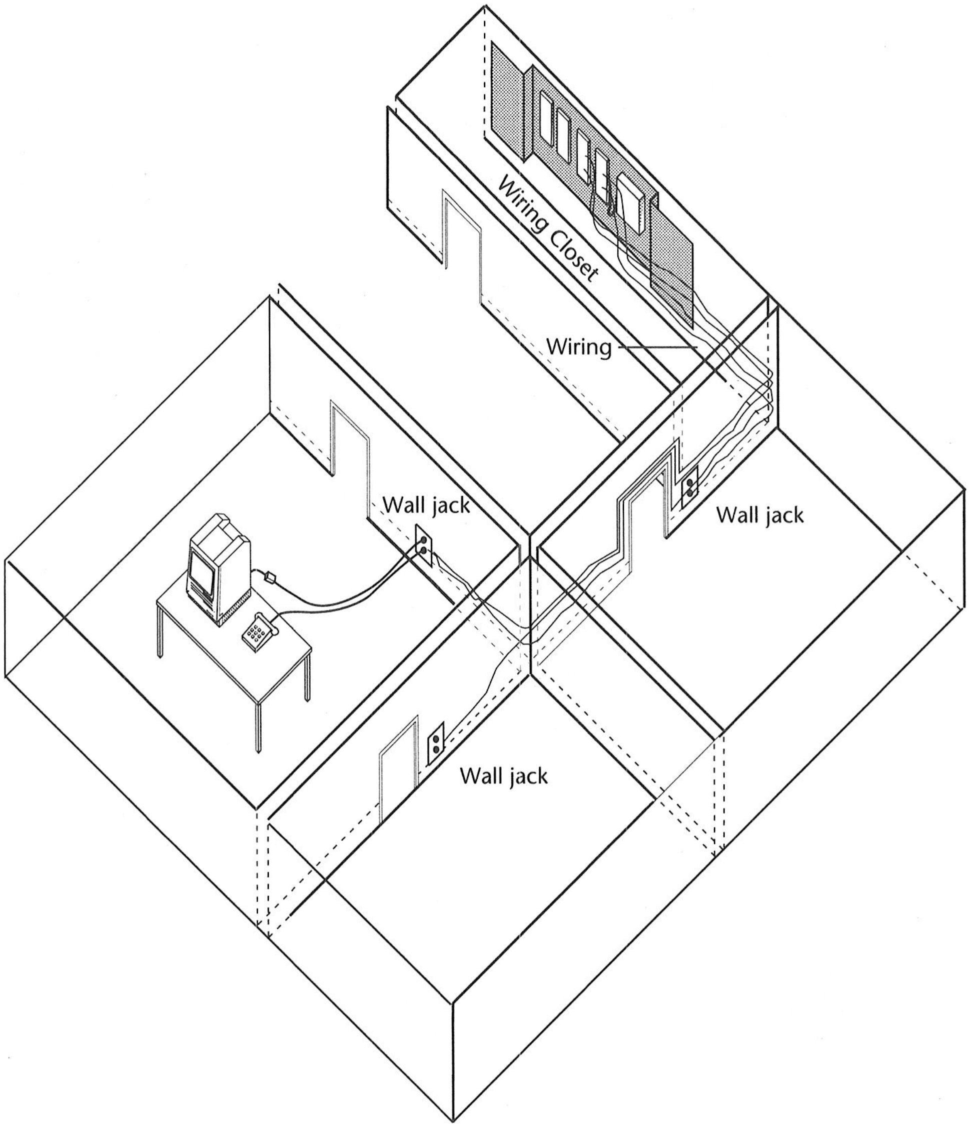
Wiring considerations

When designing a network you need to know about wiring—how a building is wired, whether you can use the existing building wiring, and the types of wiring you can use for your network.

Learn how a typical building is wired

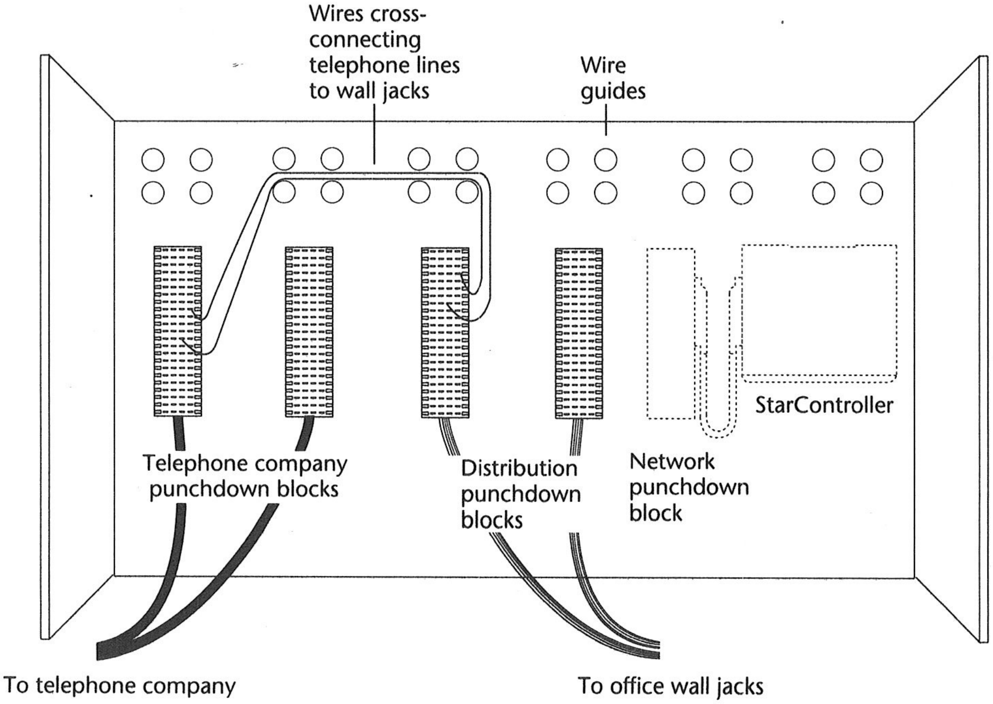
Buildings are usually wired for telephone service in a star topology. Wires run from central locations called wiring closets to wall jacks scattered throughout the building. This installed telephone wire can often be used for local area networks. It is a carefully thought-out system and widely supported. Tools and accessories for wiring telephones are readily available and standardized. The star topology also makes maintenance like adding, reconfiguring, or moving devices inexpensive over the long run.

Using telephone wiring for the network in no way interferes with the performance of the telephone system.


Wiring Closet
Wiring
Wall jack
Wall jack
Wall jack

The next illustration shows a typical wiring closet in an office building. The network in the illustration uses punchdown blocks. Permanent wires from the telephone company come into the wiring closet and connect to the telephone company punchdown blocks. Permanent distribution wires come into the wiring closet from each office wall jack and are connected to distribution punchdown blocks.

Cross-connect wires are used to connect the telephone company punchdown blocks to the distribution punchdown blocks. Cross-connect wires run up from a telephone company punchdown block, run over the posts at the top of the panel, and run down again to a distribution punchdown block.


Wires cross-connecting telephone lines to wall jacks
Wire guides
StarController
Telephone company punchdown blocks
Distribution punchdown blocks
Network punchdown block
To telephone company
To office wall jacks

A small building may have only one wiring closet; large buildings often have multiple wiring closets that are interconnected. Multi-story buildings usually have at least one wiring closet on each floor. The wall jacks on a floor are connected to the wiring closet(s) on that floor. The wiring closets in a multi-story building are often connected in a hierarchy. For example, a five-story building might have a main wiring closet in the basement connected to five satellite wiring closets, one on each floor.

Determine if you can use existing wiring

The physical limitations and regulations on the use of your building's wiring can greatly affect your choice of network layouts. Have the building manager or a telephone installer determine whether you can use existing wiring in your office. Most buildings have two or more wire pairs running to each office. Since phone systems use only a single pair of wires, you can use the extra wire pair for the network.

Evaluate network wire requirements

LocalTalk uses a single pair of wires. You can use many different types of twisted-pair wire for your network. We recommend the following:

- Solid copper (not stranded) twisted-pair wiring. You can identify twisted-pair wire by alternating color bands: green/brown, brown/green, blue/orange, orange/blue, and so on.
- Each network branch requires one wire pair. If you are installing new wiring, we recommend pulling two or four wire pairs to each workstation to leave room for growth.
- The wire should be 22- or 24-gauge. You can use 26-gauge wire for restricted distances.

Organizational considerations

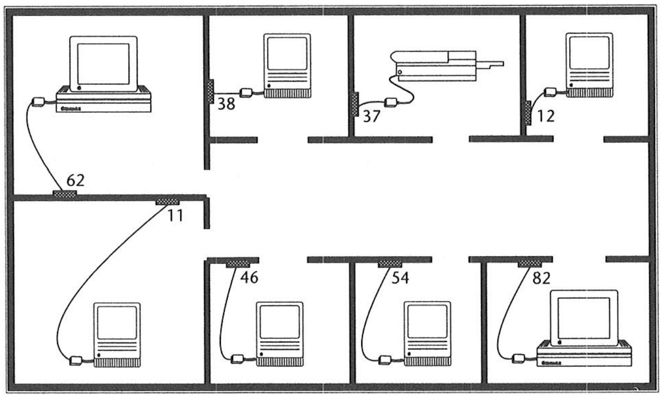
It is a good idea to take steps to ensure that the design of your network proceeds smoothly. Assigning a network manager, creating a network map, and making a network log are three important milestones.

Assign a network manager

The network manager coordinates the design and installation of the network. The network manager is also responsible for adding new users to the network and troubleshooting problems. For small installations, the network manager's duties may only require a few hours a week. For larger installations, the network manager's position may be a full-time job.

Create a network map

A network map is a visual record of your network configuration. Create a network map by copying a floor plan diagram and adding graphics representing devices and cabling. Modify the map as you change your plans, and use the completed map as a guide during installation. It is a good idea to create the map on a computer so you can easily modify it.



A simple network map showing floor layout, devices, and cabling

Maintain a network log

A network log is a record of the names of devices, location of wire pairs, wall-jack numbers, and other information about the network. A simple network log may contain the name, description, and StarController port number for each device on the network. A more detailed log may contain the serial number of each device, the network number, and more. Consider creating a network log to use as a reference when you are installing and managing the network. An up-to-date network log ensures that records of network equipment are always readily available. Having a complete written record of your network will make troubleshooting easier.

Name	**Wall Jack #**	**Extension #**	**StarController #**	**Port #**
Simon	*62*	*7483*	*09–15034*	*9*
Margo	*38*	*7458*	*09–15034*	*10*
Vanna	*11*	*7575*	*09–15034*	*11*
Sylvia	*12*	*7789*	*05–25934*	*1*
Frankie	*46*	*7654*	*05–25934*	*2*
Petra	*54*	*7865*	*05–25934*	*3*
Adam	*82*	*7401*	*05–25934*	*4*

Design considerations

Once you have researched the wiring and have evaluated organizational tools, consider the placement and interconnection of StarController hubs and other network devices.

Consider distance limitations

The StarController has 12 (or 24) ports, each of which can support up to four network branches. You can connect up to 3000 feet of 22–gauge cabling to a port. If four branches are connected to a port, each branch can be up to 750 feet.

Number of Branches Connected to Port	**Maximum Length per Branch Using 22-Gauge Wire**
1	3000 feet (900 meters)
2	1500 feet (450 meters)
3	1000 feet (300 meters)
4	750 feet (225 meters)

If you are using 24-gauge cabling, divide the maximum cable length per branch by 1.5.

The management bus is a separate wire pair that connects StarController hubs, allowing you to manage all StarController hubs from a single network manager's Macintosh. The total maximum length of the management bus is 3000 feet.

The management cable connects the network manager's Macintosh to a StarController. The total maximum length of the management cable is 300 feet.

Decide where to put the StarController hubs

StarController hubs should be placed in a wiring closet or central location of your building. Place the StarController in an area that is readily accessible for installation and maintenance. The wiring closet where you mount the StarController also must contain a power outlet. The temperature and humidity requirements must fall within those specified in Appendix A.

Do not place the StarController directly alongside sources of electrical interference, such as motors or heavy-current switches or a low voltage transformer (such as 12-volt transformer).

If you are wiring a building that has multiple wiring closets, you may want to place StarController hubs in both the main wiring closet and in satellite wiring closets.

Interconnect StarController hubs

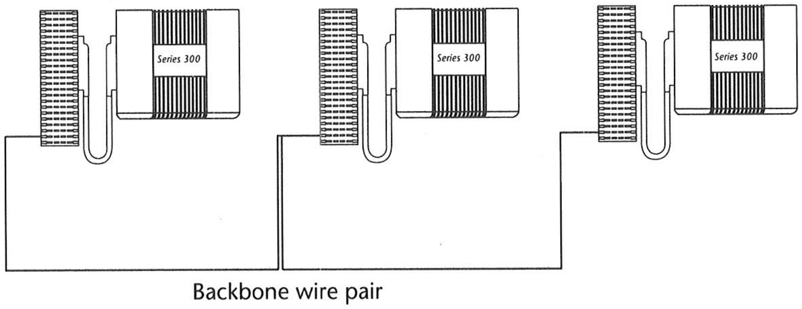
By interconnecting StarController hubs, you can create a large network supporting hundreds or even thousands of devices. You can configure StarController hubs in a backbone, hierarchy, or combination topology, add routers, or create a hybrid network with both LocalTalk and Ethernet StarController hubs. Consider calling your distributor or a consultant to help you design a large network.

These topologies are explained on the following pages:

- StarController backbone
- StarController hierarchy
- Backbone with routers
- Hierarchy with routers.

StarController backbone

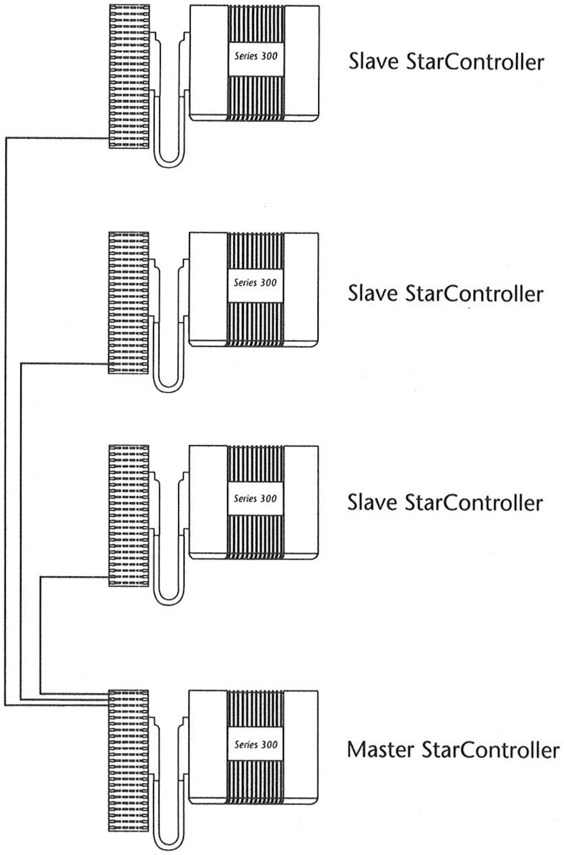
A StarController backbone is a topology where StarController hubs are interconnected by a single pair of wires. It is easy and inexpensive to configure StarController hubs in a backbone. This topology is ideal if you have several StarController hubs in a single wiring closet. You can use StarCommand to manage and troubleshoot all the StarController hubs on the network.



A StarController backbone

Hierarchy

A StarController hierarchy is a network topology where multiple slave StarController hubs are connected to a single master StarController. This topology is a good choice if you are designing a network in a large or multi-story building and would like to take advantage of existing wiring. Consider installing the master StarController in the basement or first floor and running riser cables to additional StarController hubs in satellite wiring closets on each floor of your building. Using StarCommand, you can easily manage and troubleshoot the network, or isolate a single StarController if necessary.



StarController hierarchy

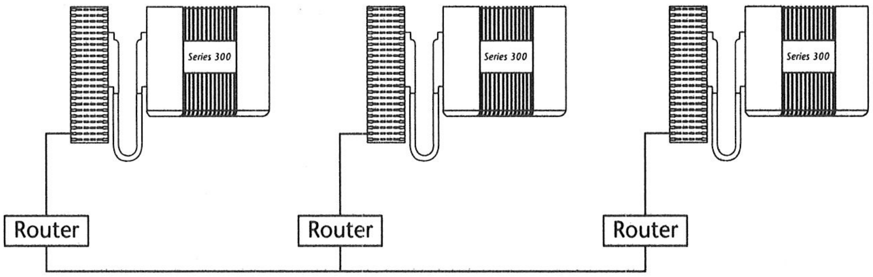
Adding routers

It is essential to add **routers** between StarController hubs in a large network. Routers isolate the traffic within specific sections of the network, and forward traffic destined to other sections of the network. Without routers, you may find the network becomes sluggish and devices may even “disappear” from the network.

There are no definitive guidelines for the number and placement of routers—it depends largely upon traffic patterns of your network. Ideally, connect one router to each StarController hub. Routers work effectively when used with a StarController backbone. Connecting all StarController hubs on the same backbone creates a high-speed link between the StarController hubs. Traffic between any two StarController hubs needs to pass between two routers.

Backbone with routers

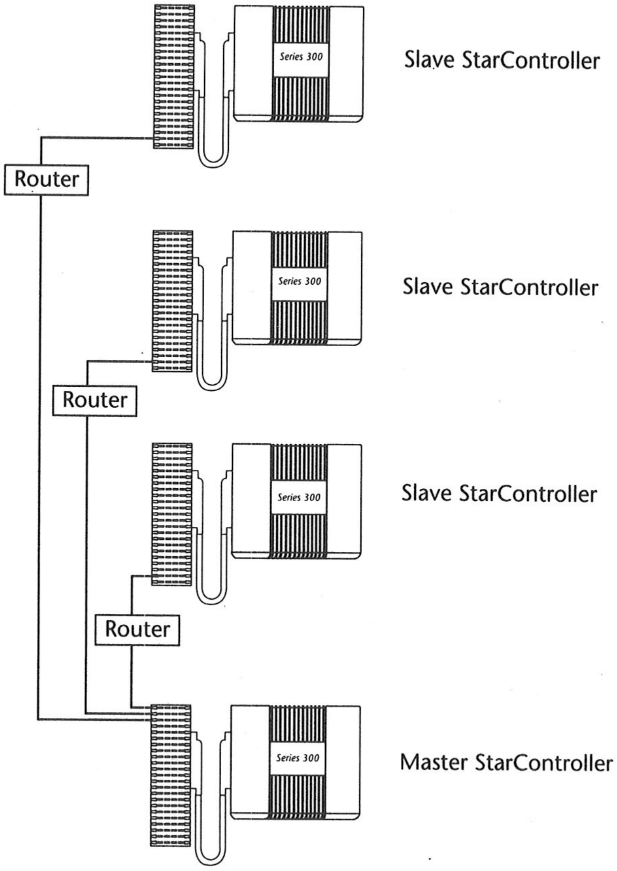
Consider adding a router between each StarController in a backbone as shown in the following illustration. This is an effective way to connect StarController hubs. By placing routers on a common backbone, preferably a high-speed backbone such as Ethernet, network signals between devices only have to pass through a maximum of two routers.



A StarController backbone with routers

Hierarchy with routers

You can add routers to isolate traffic on a StarController hierarchy. This is especially useful if you are creating a hierarchy with many StarController hubs.

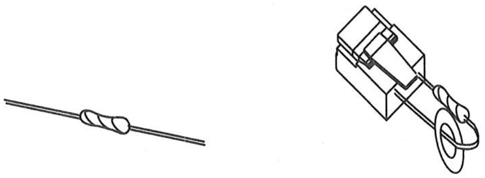


Hierarchy with routers

Terminating a network

In order to understand why it is important to terminate a network, you first need to understand how data travels along network wires. The data in each packet travels along network wires as electrical impulses. When an electrical impulse reaches the end of a length of cable, the signal can either be absorbed or reflected. A reflected signal can cause errors. Errors make a network appear to be slow, or they cause devices to occasionally disappear from the network. A resistor of the correct value placed at the end of a length of cable will absorb the signal and reduce reflections.

The StarController comes with 48 standard 120-ohm resistors to terminate your network. Many of the diagrams in this manual include a resistor's schematic symbol (—\/\/\/—) to indicate the proper location of terminating resistors on a network.



Terminating resistor and RJ-11-mounted terminating resistor

You need to terminate:

- Each end of the network branch attached to the port of a StarController. See the next section for details.
- Port 12 of selected StarController hubs when interconnecting hubs. See "Terminating Port 12 and Management Ports" in Chapter 4 for details.
- Each end of the management bus. See "Terminating the Interconnected Ports and Management Ports" in Chapter 4 for details.

Terminating each network branch

To ensure that you have a reliable network, you need to terminate the end of each network branch, whether or not there is a computer or device attached. There are three ways to do this:

- Install a 120-ohm terminating resistor in the wall jack at the end of each network branch. We recommend this method so that the wall jack is permanently terminated whether or not a PhoneNET connector is plugged in.
- Plug a internally-terminated connector, such as the StarConnector, into the wall jack.
- Plug a two-hole PhoneNET connector into the wall jack, then plug an RJ-11-mounted terminating resistor into the unused socket on the PhoneNET connector.

Avoid over-terminating a network branch. There should be only one resistor per network branch. Check to see if the wall jack contains a terminating resistor before plugging in a StarConnector or RJ-11-mounted terminating resistor.

Designate one workstation as the network manager's Macintosh

In order to manage your StarController network, designate a network manager's Macintosh. Once you have installed the management bus and management cable as described in Chapters 3 and 4, the network manager can use this Macintosh to run the StarCommand software to monitor network activity and turn ports on and off. The management cable is a dedicated 4-wire cable that can be extended up to 300 feet (90 meters). You can use the StarCommand application to manage both LocalTalk and Ethernet StarController hubs.

Chapter 3

Installing and Wiring

Once you have designed your network, you are ready to install and wire the StarController and network devices. This chapter tells you how to install a network with one StarController. The exact steps required to install your network depend upon the how you plan to wire your network, the placement of devices, and other factors. The steps you take may differ—you may want to skip the steps that don't apply to your needs. This chapter gives general installation guidelines, including:

- Wiring wall jacks for network devices
- Installing the StarController and network punchdown block
- Connecting the branch cables to a network punchdown block
- Connecting the network manager's Macintosh to the StarController.

If your network has multiple StarController hubs, install them as instructed in this chapter and then proceed to Chapter 4 to interconnect the hubs.

Once you have installed your StarController, see Chapter 5, "Using the StarController."

Component checklist

Use the following checklist to make sure you have everything you need before going on to the installation instructions in this chapter:

☐ The StarController product package

☐ A StarController wiring kit with a punchdown block, patch panel, or harmonica block

☐ One PhoneNET connector or StarConnector for each device on the network

☐ One RJ-11 or RJ-45 wall jack for each office

☐ A screwdriver for mounting the StarController

☐ A punchdown tool and a small roll of 24-gauge wire to cross-connect between punchdown blocks.

Perform the following steps prior to installing the network:

☐ Fill out the registration card included in the StarController package and return it to Farallon so that you will receive software and information updates. Keep the upper portion of the registration card for your records. It contains a serial number that will help you later when you use StarCommand software.

☐ Prepare your network map and log and keep them handy to record the locations of devices and other information about network devices.

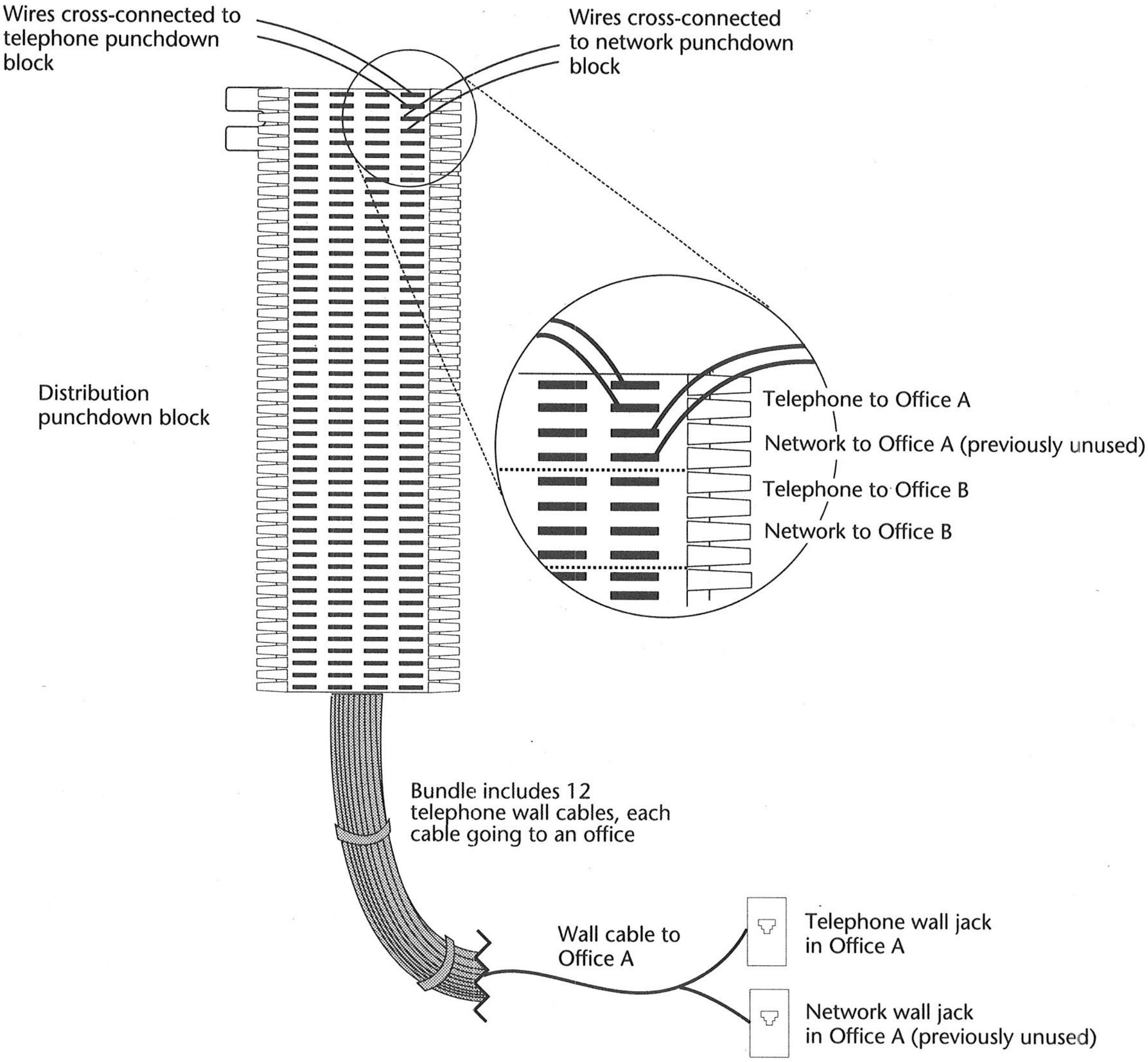
☐ If there is no AC outlet near the wiring closet in which you are installing the StarController, you will need to install one.

Locate an unused wire pair going to each office

You need to take a closer look at the wiring closet to identify an unused wire pair going to each office. Wires from each office lead to the central wiring closet. Many lengths of wall cable, one from each office, are wired to each distribution punchdown block in the wiring closet. Typically, a single length of wall cable contains four wires that are punched down on the distribution punchdown block in a systematic way. Four adjacent rows of pins on the distribution punchdown block correspond to the four wires going to each office. You may notice a handwritten number or code corresponding to an office location on the plastic guide on either side of the rows of pins. You may need to obtain a map or diagram of your building's telephone system to determine where the wires lead.

Usually two wires from each office are used for the telephone. You can tell which wires these are because they are cross-connected to a telephone punchdown block. It is the unused wire pairs that you will use for the network. If you are using 2-pair wall cable, often the wires used for the telephone are red and green, while the yellow and black wires remain unused.

If you don't have an extra wire pair going to each office, you should install additional distribution punchdown blocks and wall cabling. We recommend installing 2- or 4-pair, 22- or 24-gauge, solid-core copper, unshielded twisted-pair wire. You may need to hire a telephone installer to complete this task.

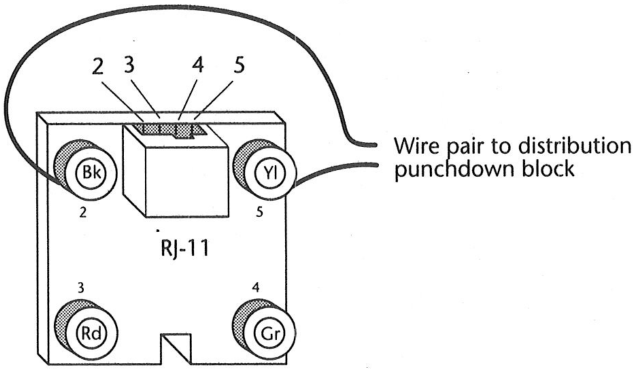

Wires cross-connected to telephone punchdown block
Wires cross-connected to network punchdown block
Distribution punchdown block
Telephone to Office A
Network to Office A (previously unused)
Telephone to Office B
Network to Office B
Bundle includes 12 telephone wall cables, each cable going to an office
Wall cable to Office A
Telephone wall jack in Office A
Network wall jack in Office A (previously unused)

Identifying unused wire pairs on a distribution punchdown block

Wire the wall jacks

You should install an RJ-11 wall jack at each network device location. An RJ-11 wall jack usually has four pins, two of which (pins numbered 2 and 5) are used for the network. Attach the unused wire pair to these pins.

If you purchased an RJ-11 wall jack from Farallon, the terminal posts are identified by color, and the RJ-11 wall jack wiring resembles the following illustration. If you are using another type of wall jack, be sure that you connect the unused wire pair to the terminal posts corresponding to pins 2 and 5.



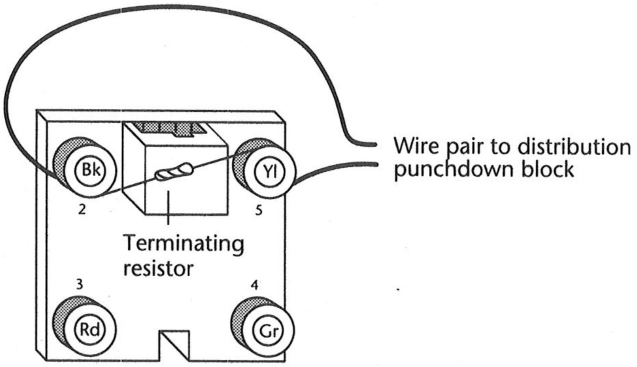
Installing a terminating resistor in an RJ-11 wall jack

If you plan to use a two-hole PhoneNET connector, you should install a terminating resistor in the wall jack to increase network reliability. If you plan to use a internally-terminated StarConnector, you can skip this section.

To install a terminating resistor:

1. Wrap one end of the resistor clockwise around the screw terminal corresponding to pin 2.

2. Wrap the other end of the resistor clockwise around the screw terminal corresponding to pin 5. Be careful not to dislodge the yellow and black screw lugs leading to the RJ-11 socket.



Testing a branch of a star

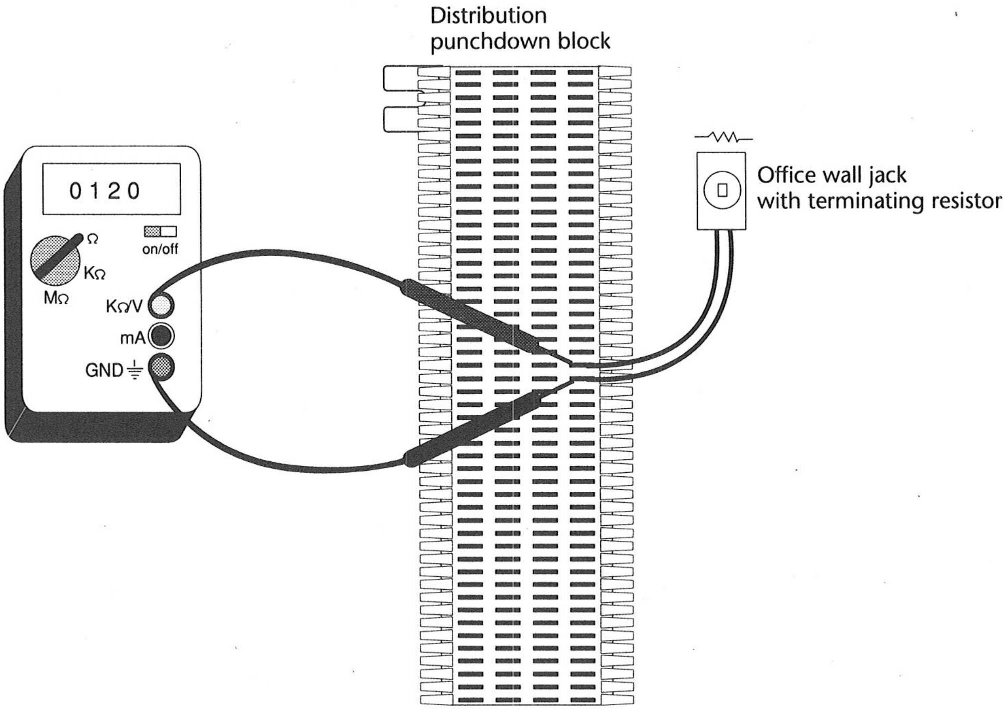
After installing a terminating resistor in the wall jack at the end of each branch cable, test the cables to confirm that the wall jacks are correctly wired.

Important: Test the cables *before* wiring to the StarController ports and before you attach a PhoneNET connector.

Use an ohm meter and a PhoneNET connector to test each network branch cable from the wiring closet.

To test a branch of a star:

1. Attach the ohm meter to a network branch cable in the wiring closet.
2. Measure the resistance. Resistance should be 120 ohms, plus approximately 30 to 50 ohms for every additional 1000 feet of cable.


Distribution punchdown block
Office wall jack with terminating resistor
0120
Ω
KΩ
MΩ
on/off
KΩ/V
mA
GND

Measuring the resistance in a network branch

If resistance is infinite, the cable is probably cut, damaged or not terminated. Inspect the cable carefully. Check the wall jack at the end of the cable to make sure that a terminating resistor is correctly installed. If resistance is close to zero or approximately 30 to 50 ohms for each 1000 feet of cable, either the cable has a short or a PhoneNET connector is plugged into a wall jack along the cable. Check the cable for wires that are crimped together.

3. Measure DC voltage. There should be none. If there is DC voltage, the network branch cable is probably connected to a pair of wires used by a live telephone line. Locate the telephone circuit and disconnect it from the network wires or choose another pair of wires for the network.

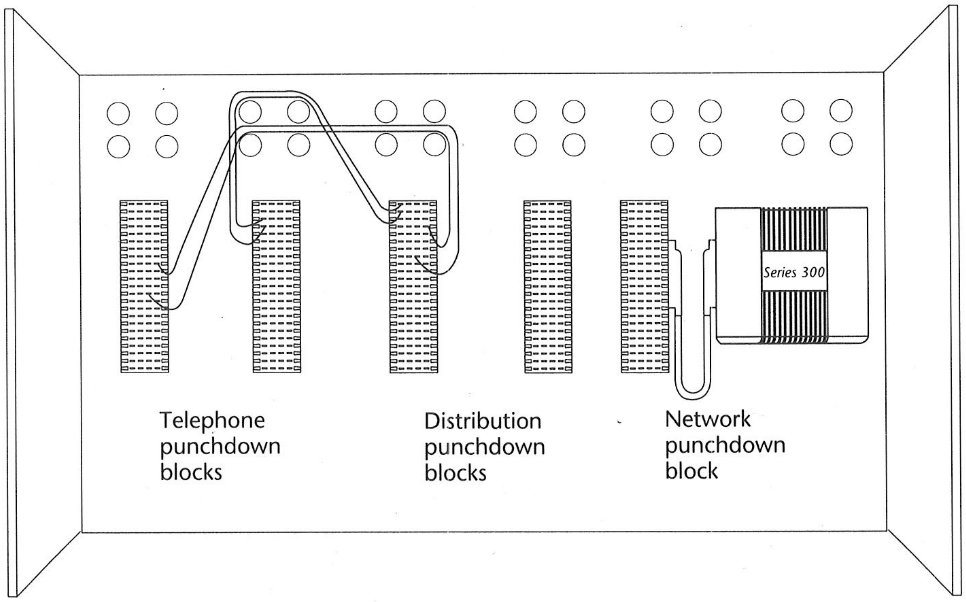
4. Measure AC voltage. There should be none. If there is AC voltage, the network branch cable is probably connected to a wire pair used by a non-network device. Locate the AC voltage source and disconnect it from the network, or choose another wire pair for the network.

5. Plug an unterminated PhoneNET connector into the wall jack at the end of a network branch cable.

6. Attach the ohm meter to the corresponding network branch cable in the wiring closet and measure the resistance. The resistance should be between 0 and 100 ohms. If resistance is greater than 100 ohms, you may have a bad connection or you may have exceeded the recommended cable length. If resistance is the same as it was before you plugged in the PhoneNET connector, either you have connected the 120-ohm terminating resistor to the wrong pair of wires inside the wall jack, or you are measuring the wrong network branch cable.

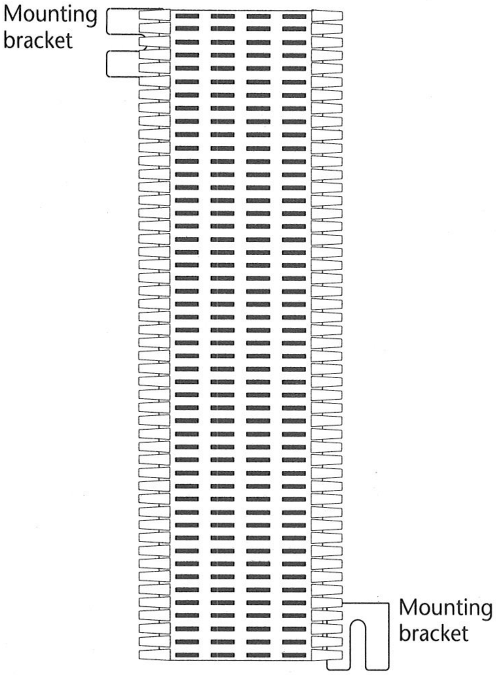
Install the StarController and network punchdown block

Once you have wired the wall jacks in each office, you are ready to install the StarController and network punchdown block in the wiring closet. Install the StarController and network punchdown block in the same area so that the 10-foot RJ-21 cable can connect them. Keep in mind that you also will need to have an AC power outlet close enough so that the power adaptor will reach to the StarController.



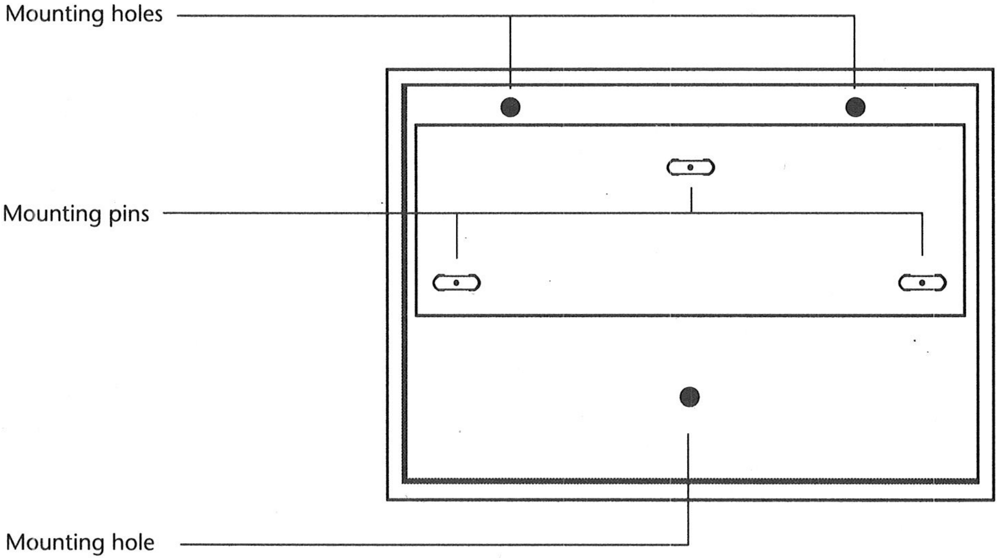
To install the network punchdown block:

The network has two mounting brackets; one on the top left, the other on the lower right. Secure the punchdown block to the wall of the wiring closet with screws.



To install the mounting plate:

The StarController has a mounting plate that you need to screw into the wall. The mounting plate has three holes. Make sure that the single hole faces downward before securing the bracket.



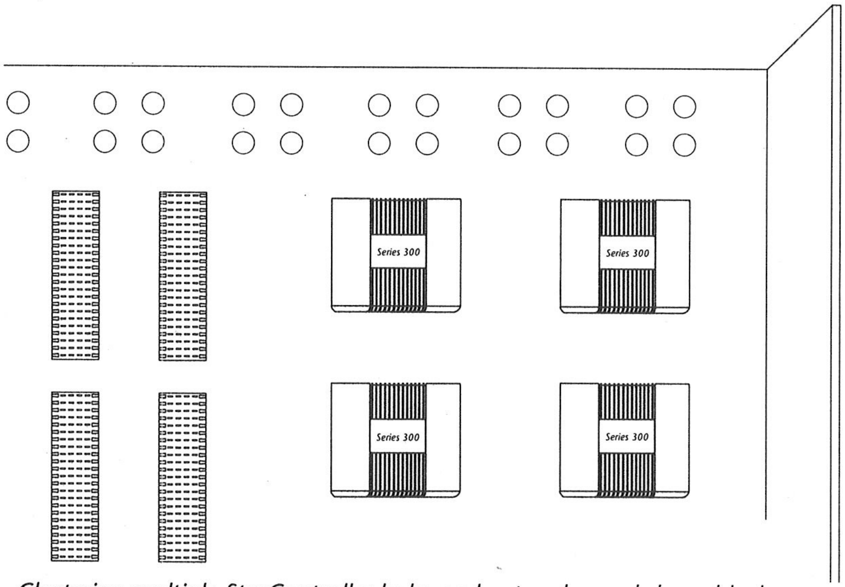
Once you have screwed in the mounting plate, you can slide the StarController onto it. First of all, orient the StarController with the rounded side facing downward and the RJ-21 port on the left-hand side.

Take the StarController and push it against the mounting plate and slide the StarController down. It should seat firmly into the mounting plate.

You can attach a StarController to a wall plate in any of four orientations. This may be useful if you would like the LEDs to face a different direction. To attach the front of the StarController to the wall plate, you must first remove the plastic label on the front of the StarController using a small screwdriver. You can snap the label to the other side of the StarController.

Installing multiple hubs in a wiring closet

If you are installing a number of StarController hubs in the wiring closet, you may choose to cluster the StarController hubs and the network punchdown blocks. The StarController package includes a paper template to help you arrange the StarController hubs in a grid, while leaving enough space for the RJ-21 cables and power lead. Use the template to mark the correct location of the mounting plate before you install the StarController.

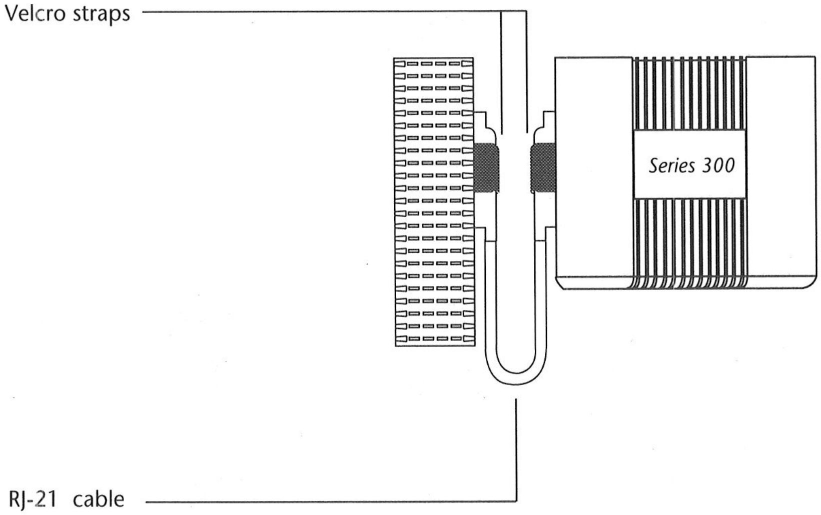


Clustering multiple StarController hubs and network punchdown blocks

To install the RJ-21 cable:

Connect the StarController to the network punchdown block with the RJ-21 cable. Plug one end of the RJ-21 cable into the network connector of the StarController. Plug the other end of the cable into the RJ-21 socket on the network punchdown block.

The network punchdown block and StarController have a Velcro strap to secure the cable.



Now that you have installed the StarController and network punchdown block, you are ready to connect the office wiring to the network punchdown block.

Identify the pins on the network punchdown block

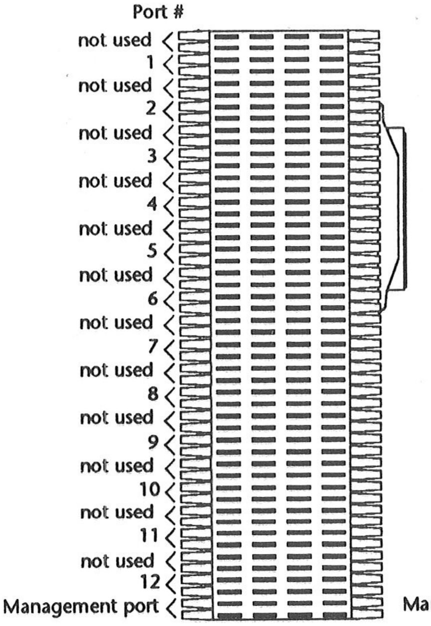
Before you cross-connect punchdown blocks, you need to identify the pins on the network punchdown block. A punchdown block has 50 rows of pins. Two rows are used for each network branch.

When connected to a 307 or StarController/12 (357) hub, every other two-row set is used for the network; the remaining two-row sets are unused. When connected to a StarController/24 (377) hub, the previously unused rows of pins on the network punchdown block are used for ports 13–24.

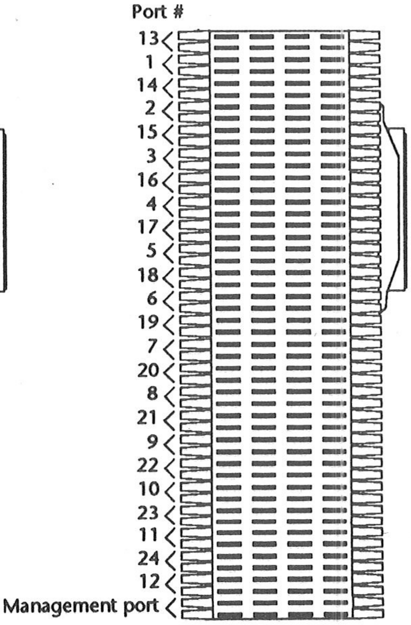
The last two rows of pins are used for the management bus, which is discussed in Chapter 4. Because each row of pins contains four pins across, you can connect up to four branches per port.

Included in the StarController package are templates that fit inside the punchdown block cover and show pin assignments for the 307, 357 and 377 hubs. Refer to these templates or the following diagram to attach network branch wiring to the punchdown block.

StarController 207, 307, 357
(12 ports)



StarController 377
(24 ports)



Cross-connecting the network punchdown block and distribution punchdown block

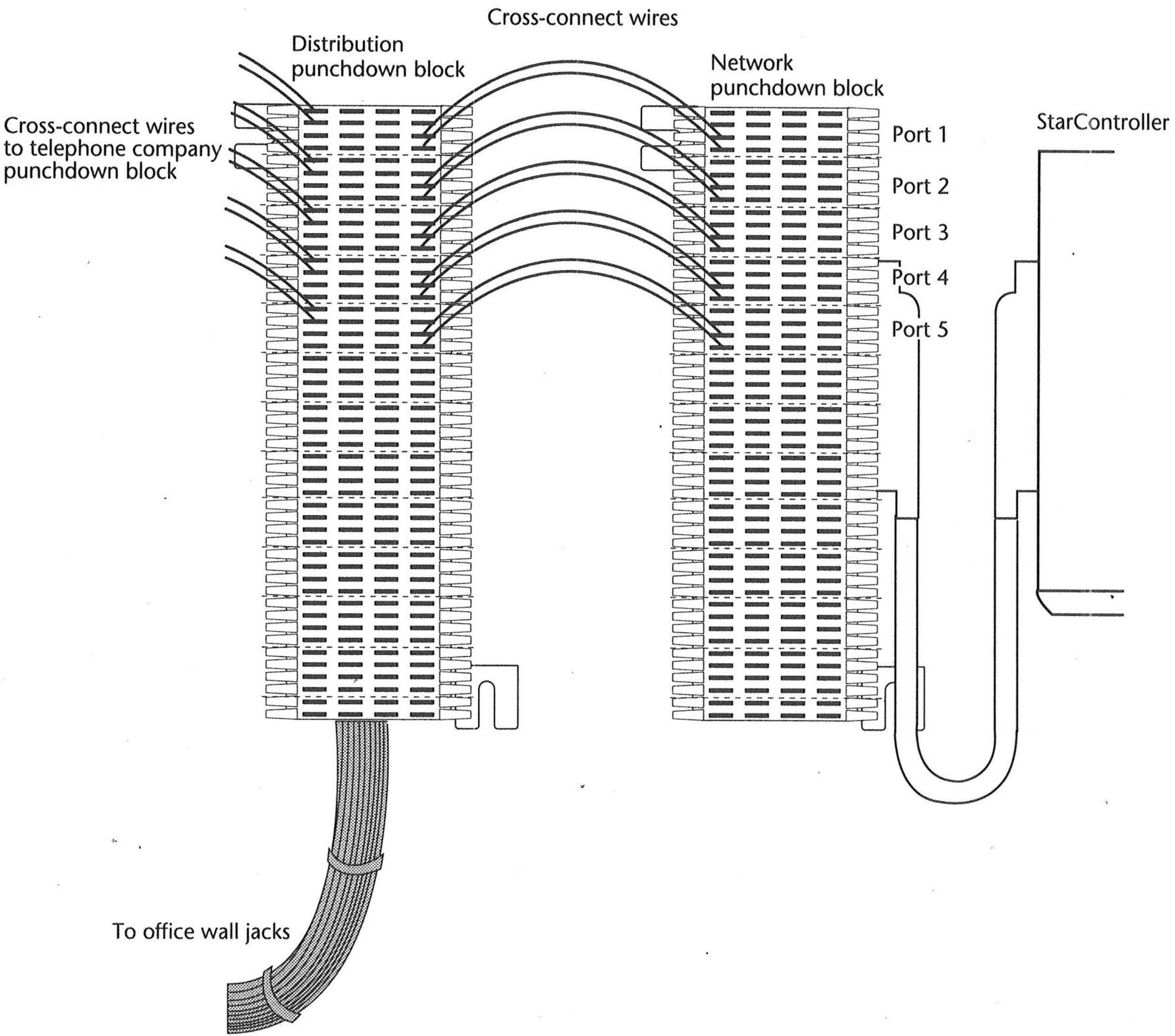
Once you understand which pins you can use, you are ready to install the cross-connect wires. Locate the unused pins on the distribution punchdown block coming from an office and punch down two wires. Punch down the other end of the wires on a port on the StarController. If you are connecting one device per port, simply repeat this procedure, connecting two pins from each office to a separate port on the StarController.

To connect multiple network branches on the same port, connect the pins from the branches to the same row of pins on the network punchdown block. For maximum reliability and manageability, attach one network branch per StarController port and one device per network branch.

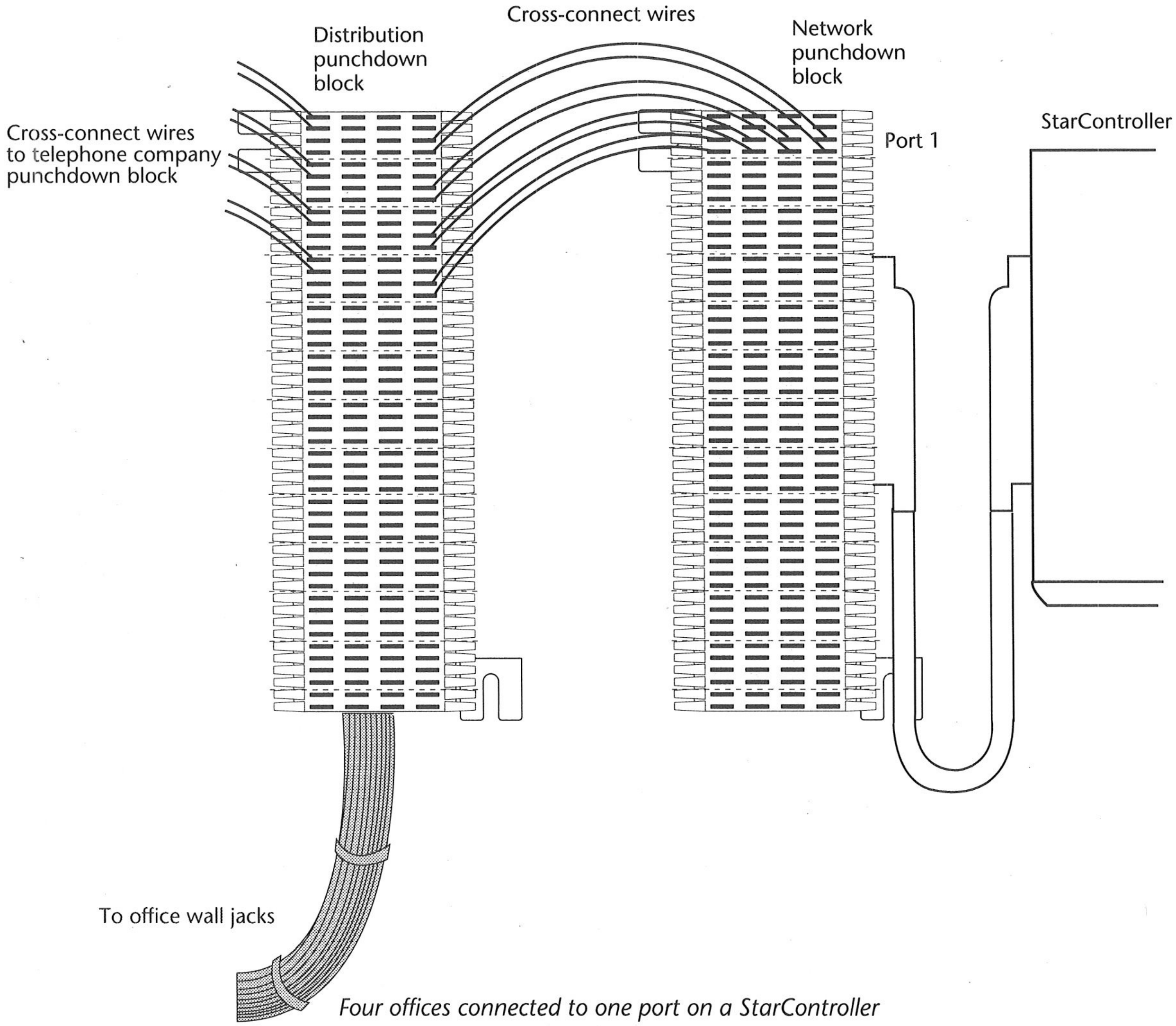
The actual maximum number of branches and devices you can attach to a single StarController is primarily limited by traffic. We recommend attaching no more than four branches per port and no more than 48 devices per StarController. Place heavily used network devices such as printers and file servers on their own ports.

LocalTalk is not polarity sensitive.

Note: If you are connecting a network device such as a workstation or router to port 12, you will need to manually terminate this port. See "Terminating Port 12 and the Management Port" in Chapter 4 for details.



Five offices connected to five ports on a StarController


Distribution punchdown block
Cross-connect wires
Network punchdown block
Cross-connect wires to telephone company punchdown block
Port 1
StarController
To office wall jacks

Four offices connected to one port on a StarController

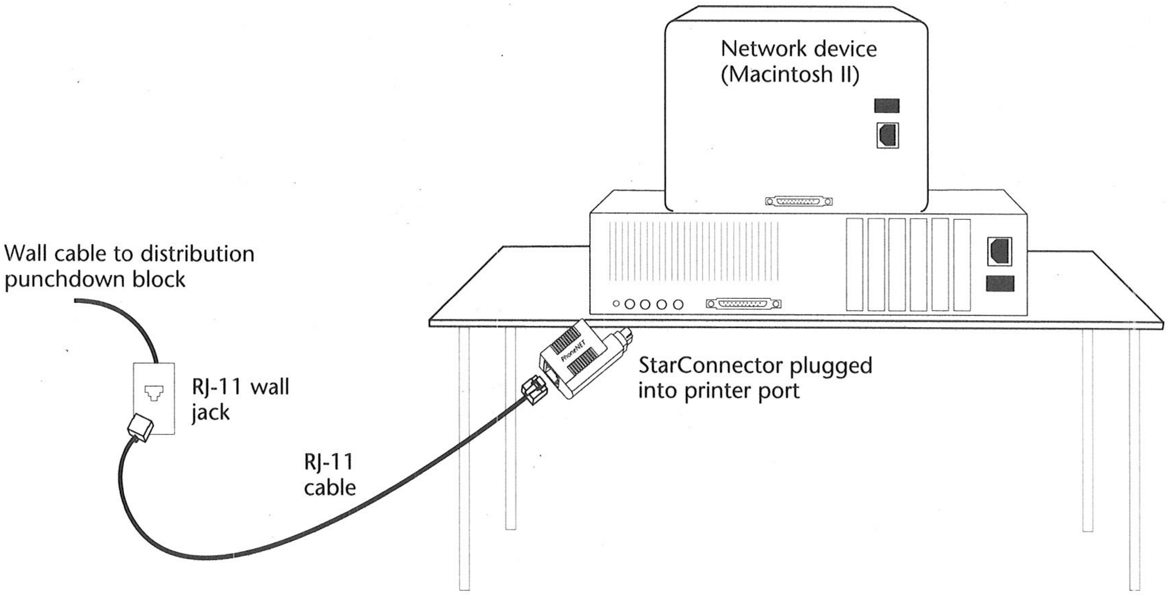
Connecting a network device to a wall jack using a PhoneNET connector

Once you have finished installing the StarController and network punchdown block in the wiring closet, you need to go back into each office and install a PhoneNET connector or StarConnector on each device. Each connector includes an RJ-11 cable to link the wall jack to the connector.

To connect the network device:

1. Plug the PhoneNET connector or StarConnector into the LocalTalk port on the network device. On a Macintosh, the printer port is used for LocalTalk.

2. Plug one end of the RJ-11 cable into the wall jack and the other end into the PhoneNET connector or StarConnector.


Network device
(Macintosh II)
Wall cable to distribution punchdown block
RJ-11 wall jack
RJ-11 cable
StarConnector plugged into printer port
PhoneNET

3. Switch on the network device.

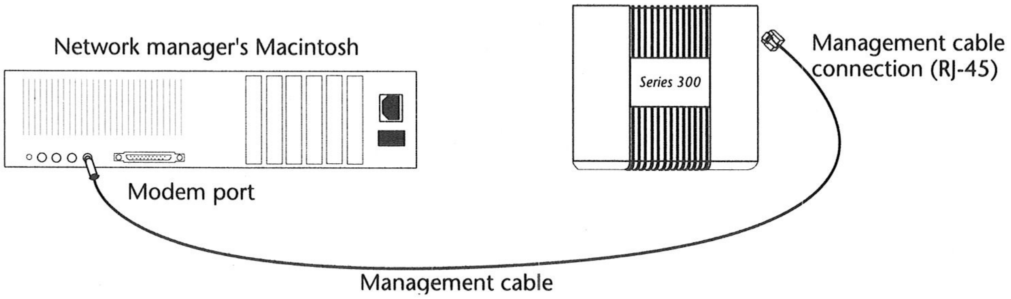
4. Repeat steps 1 through 4 for each device you want to connect to the network.

Connecting the network manager's Macintosh

To use the StarCommand application to manage and troubleshoot your network, you need to connect the network manager's Macintosh. If your network has multiple StarController hubs, you will also need to connect the management bus as described in Chapter 4. The StarController package includes a management cable to connect the modem port of the network manager's Macintosh to the management connection on the StarController. If the network manager's Macintosh is located more than 10 feet (3 meters) from the StarController, you need to extend the management cable. See the following section for details.

To connect the network manager's Macintosh:

1. Switch off the network manager's Macintosh.
2. Connect the RJ-45 plug on the management cable into the management cable connection on the StarController.


Network manager's Macintosh
Series 300
Management cable connection (RJ-45)
Modem port
Management cable

3. Connect the mini DIN-8 plug on the management cable to the modem port on the back of the Macintosh.

Extending the management cable

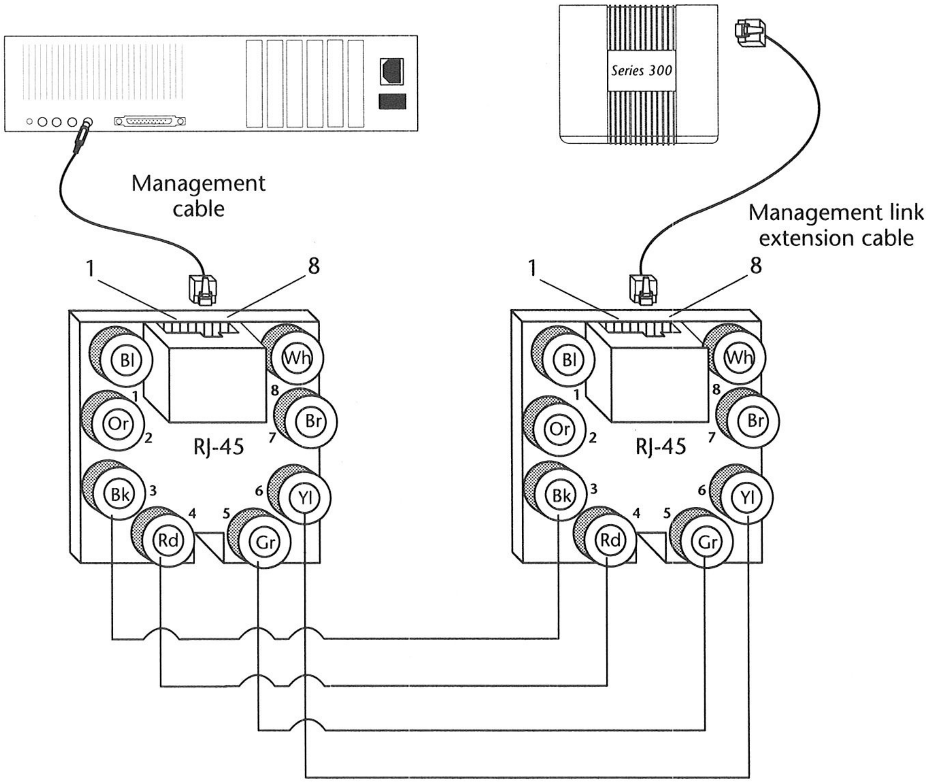
If the network manager's Macintosh is located more than 10 feet (3 meters) from the StarController, you must extend the management cable. You will need two RJ-45 wall jacks, some twisted-pair cable, and an RJ-45 management link extension cable that has pins 3, 4, 5, and 6 wired. This cable is included in the package.

The management connection conforms to RS-232 specifications. You can extend the management cable up to 300 feet (90 meters).

To extend the management cable:

1. Install one RJ-45 wall jack near the StarController and another near the network manager's Macintosh.
2. Connect the wall jacks with two wire pairs (four wires). Wire pins 3, 4, 5, and 6 on both wall jacks. See the following illustration for details. Do not reverse the polarity when wiring the wall jacks.
3. Connect the network manager's Macintosh to the wall jack using the management cable.

4. Connect the StarController to the wall jack with the RJ-45 management link extension cable.



Extending the management cable

Chapter 4

Interconnecting StarController Hubs

By interconnecting StarController hubs, you can create a large network supporting hundreds or even thousands of devices. This chapter describes how to interconnect, terminate, and configure multiple StarController hubs in a backbone or hierarchy.

A large network requires careful planning. Chapter 2, "Network Planning," explains some important design considerations. Be sure you have already made a detailed network map and understand network termination before you begin. Once you have designed your network, go ahead and install the wall jacks, network cabling, and StarController hubs as directed in Chapter 3, "Installing and Wiring."

Once you have successfully interconnected the hubs, proceed to Chapter 5 to begin using them.

What does interconnection involve? The main steps are:

- Connect the StarController hubs together so that all network devices can communicate with each other.
- Connect the management bus pins on the StarController hubs together so you can monitor the entire network from a single network manager's Macintosh.
- Terminate the interconnected network port pins and the management bus pins so that the signals between StarController hubs are reliable.
- Switch the port interconnect setting on or off for selected ports on some StarController hubs.

Interconnecting port 12 on StarController hubs

StarController hubs were designed to use port 12 as the interconnection port. To connect two StarController hubs, interconnect the port 12 pins (punchdown pins 47 and 48) on the hubs. You don't need to use a PhoneNET connector to interconnect two StarController hubs. The maximum distance between any two StarController hubs is 3000 feet (900 meters) using 22-gauge cabling.

Although you can interconnect StarController hubs using any port, port 12 is used for interconnection because it is not terminated, thereby allowing you to create a longer StarController backbone. See "Terminating Port 12 and the Management Bus" for more details about termination.

If you have a StarController hierarchy, any of the ports on the master StarController can also be used for interconnection.

StarController/24 hub: Port 12 should be used as the interconnection port.

Interconnect the management bus on the StarController hubs

In order to manage and troubleshoot your network from a single network manager's Macintosh, you should interconnect the management bus (punchdown pins 49 and 50) on all of the StarController hubs. You interconnect the management bus in much the same way as you interconnect ports—using a pair of wires. The management bus can be up to 3000 feet (900 meters) using 22-gauge cabling.

Once you have connected the management bus, you can connect the network manager's Macintosh to the management cable connection on any of StarController hubs on the network and you will be able to monitor all StarController hubs. See "Connecting the Network Manager's Macintosh" in Chapter 3.

Because the StarController/12 and StarController/24 hubs are network-visible devices, you can run StarCommand from any Macintosh on the network and control hubs over AppleTalk. Three diagrams at the end of this chapter describe management bus wiring variations.

Terminating port 12 and the management port

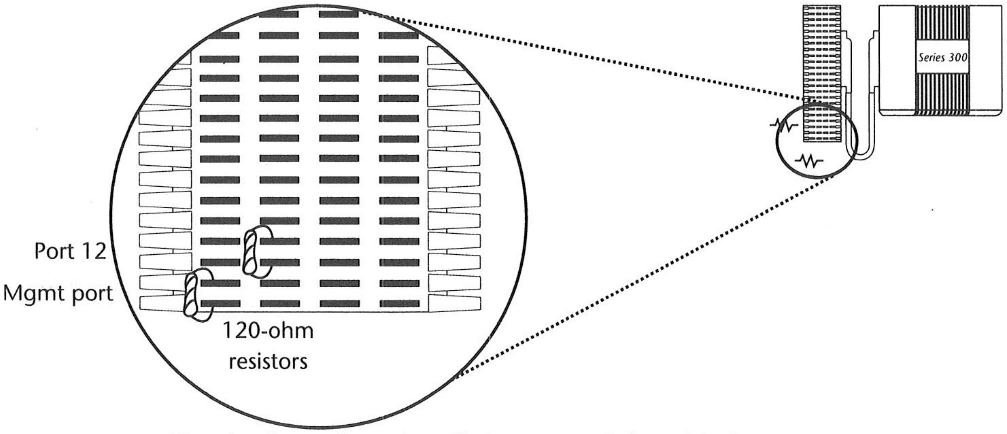
You need to install terminating resistors at selected points on your network to avoid signal reflections and create a reliable network. The StarController package includes terminating resistors. See “Terminating a Network” in Chapter 2 for more information about termination.

You only need to attach terminating resistors for port 12 or the management bus for StarController hubs. The diagrams in the chapter tell you where terminating resistors are required.

To terminate a port, you can either punch down a loose terminating resistor or add a clip-on terminating resistor. Be sure to install a terminating resistor on an unused pair of pins; do not attach a terminating resistor lead and a wire on the same pin. Be sure the terminating resistor leads only touch two pins; you may want to trim any excess wire from the terminating resistor once it is installed.

Terminate port 12 by attaching a terminating resistor between the port 12 pins (punchdown pins 47 and 48) on the network punchdown block. Terminate the management bus pins by attaching a terminating resistor between the management port pins (punchdown pins 49 and 50) on the network punchdown block.

The following illustration shows a terminating resistor installed on port 12 and the management port of a punchdown block.



Terminating resistors installed on a punchdown block

Switching port interconnect on when directly interconnecting StarController hubs

When directly interconnecting StarController hubs, you need to be aware of the port interconnect settings. This setting controls a port's tolerance to fragments and jams. The port interconnect settings are controlled through the StarCommand software (see the *StarCommand User's Guide* for details). Switch port interconnect *on* only when you are directly connecting two or more StarController hubs. Leave port interconnect switched off when connecting a network device such as a router or workstation to a port.

The StarController is shipped with port interconnect switched off for all ports except port 12. With this configuration, you can connect network devices to any port except port 12, and directly connect another StarController to port 12. If you are creating a StarController backbone by interconnecting port 12, you don't need to change the port interconnect setting. If you would like to connect a network device such as a router or workstation to port 12, use StarCommand to switch port interconnect off for port 12.

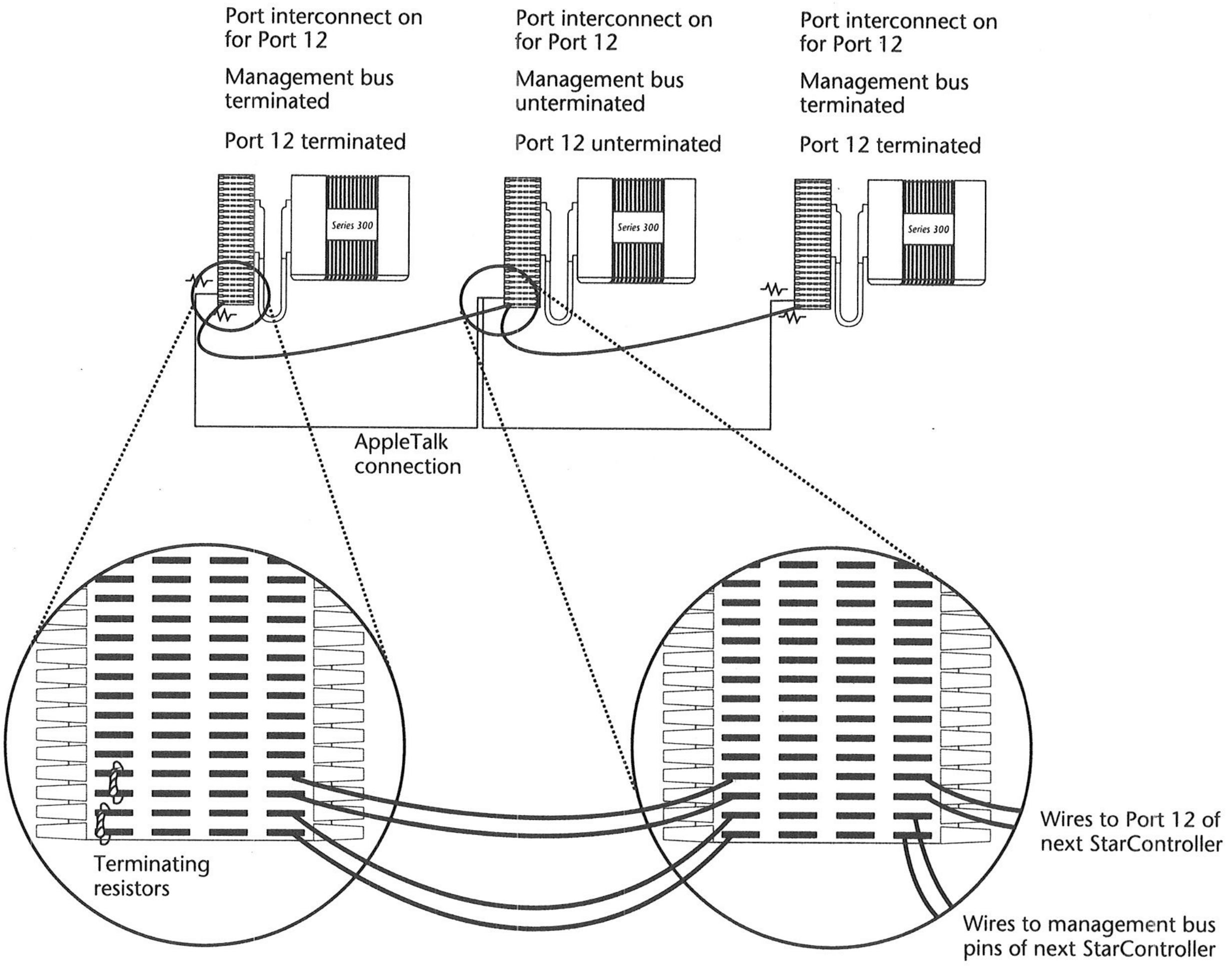
	Definition	***Port Interconnect On (Tolerance High)***	***Port Interconnect Off (Tolerance Low)***
Fragment	*Packet less than 56 bits long*	*Ignored*	*Port shut off temporarily when 12 fragments are received within 100 milliseconds*
Jam	*Excessively long packet transmission*	*Port shut off temporarily when a packet longer than 250 milliseconds is received*	*Port shut off temporarily when a packet longer than 50 milliseconds is received*

Interconnecting StarController hubs directly

This section describes how to configure a StarController backbone or hierarchy, and explains how this affects port 12 termination and port interconnect settings.

To configure a StarController backbone:

1. Interconnect port 12 pins on the punchdown block for each of the StarController hubs.
2. Interconnect the management bus pins on each of the StarController hubs.
3. Terminate port 12 pins for the StarController hubs at both ends of the backbone by installing a terminating resistor. Do not terminate port 12 pins for the StarController hubs in the middle of the backbone.
4. Terminate the management bus for the StarController hubs at both ends of the backbone by installing a terminating resistor. Do not terminate the management pins for the StarController hubs in the middle of the backbone.
5. Configure port interconnect setting if necessary. Port Interconnect should be switched on for port 12 and off for all other ports. The StarController is shipped with these port interconnect settings.


Port interconnect on for Port 12
Management bus terminated
Port 12 terminated
Port interconnect on for Port 12
Management bus unterminated
Port 12 unterminated
Port interconnect on for Port 12
Management bus terminated
Port 12 terminated
Series 300
Series 300
Series 300
AppleTalk connection
Terminating resistors
Wires to Port 12 of next StarController
Wires to management bus pins of next StarController

To configure a StarController hierarchy:

1. Interconnect the ports on a StarController hierarchy by running a separate pair of wires from port 12 pins on the punchdown block for each of the slave StarController hubs to any available port on the master StarController. In the following illustration, three slave StarController hubs are connected to ports 1 through 3 on the master StarController.

2. Interconnect the management bus pins on each of the StarController hubs.

3. Terminate port 12 pins on each slave StarController by installing a terminating resistor.

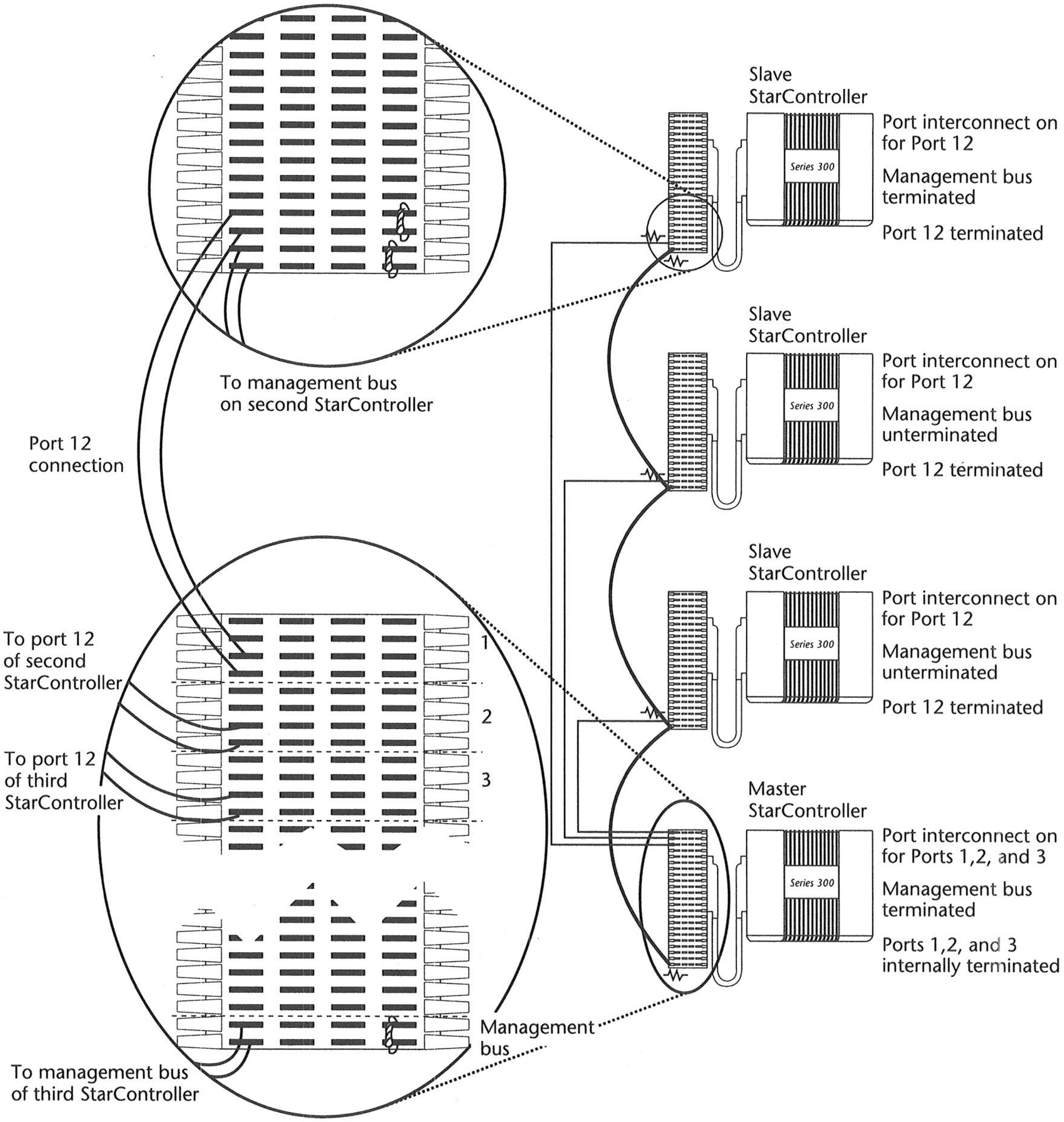
   Ports 1 through 11 on a StarController are internally terminated; there is no need to install a terminating resistor on these ports of the master StarController. However, if you are connecting a device to port 12 of the master StarController, be sure to terminate this port.

4. Terminate the management port on the StarController hubs at each end of the bus by installing a terminating resistor.

5. Configure port interconnect for a StarController hierarchy.

   - Switch port interconnect on for the interconnected ports on the master StarController.

   - Switch port interconnect on for port 12 on the slave StarController hubs. StarController hubs are shipped with port interconnect switched on for port 12.


Slave
StarController
Port interconnect on for Port 12
Management bus terminated
Port 12 terminated
Slave
StarController
Port interconnect on for Port 12
Management bus unterminated
Port 12 terminated
Slave
StarController
Port interconnect on for Port 12
Management bus unterminated
Port 12 terminated
Master
StarController
Port interconnect on for Ports 1,2, and 3
Management bus terminated
Ports 1,2, and 3 internally terminated
Series 300
To management bus on second StarController
Port 12 connection
To port 12 of second StarController
To port 12 of third StarController
1
2
3
Management bus
To management bus of third StarController

Interconnecting StarController hubs with routers

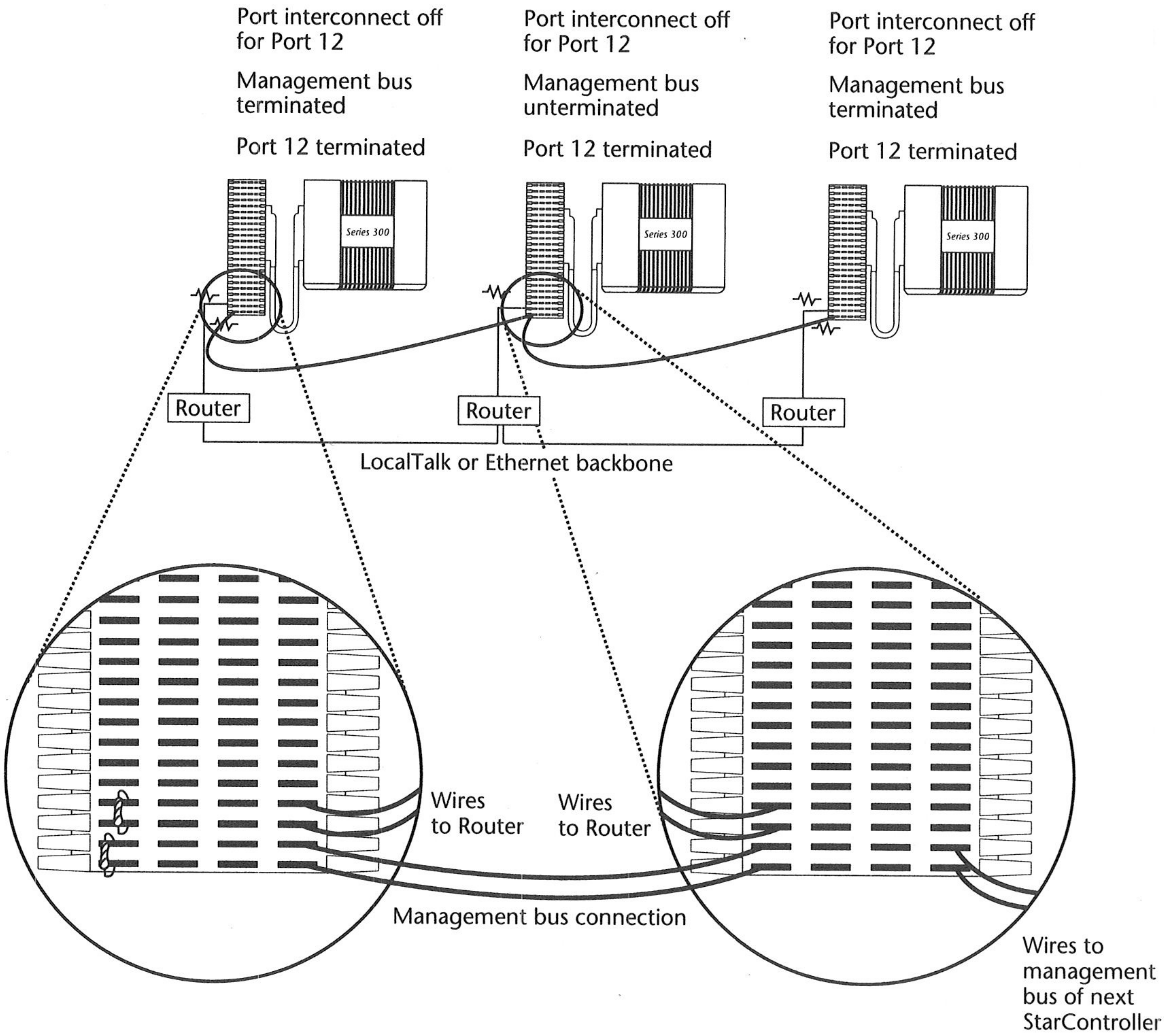
This section describes how to add routers to a StarController backbone or hierarchy, and explains how this affects port 12 termination and port interconnect settings.

Because the each StarController is connected to a router, terminate port 12 of each StarController. Routers usually have no built-in termination, so you should terminate them as you would any other network device. Install a terminating resistor in the wall jack connected to the router, use a StarConnector, or use an RJ-11–mounted terminating resistor.

To configure a StarController backbone with routers:

1. Connect port 12 pins on the punchdown block for each of the StarController hubs to a separate router.
2. Connect the routers in a backbone as recommended in the manual that came with the router.
2. Interconnect the management bus pins on each of the StarController hubs.
3. Terminate port 12 pins for all StarController hubs by installing a terminating resistor.

   You do not need to terminate ports 1 through 11 on a StarController because they are internally terminated. If you are connecting a device to port 12 of the master StarController, be sure to terminate it.
4. Terminate the management bus pins for the StarController hubs at both ends of a backbone. Do not terminate the management bus pins for the StarController hubs in the middle of the backbone.
5. Configure the port interconnect setting: port interconnect should be switched off for port 12 of all StarController hubs.


Port interconnect off for Port 12
Management bus terminated
Port 12 terminated
Port interconnect off for Port 12
Management bus unterminated
Port 12 terminated
Port interconnect off for Port 12
Management bus terminated
Port 12 terminated
Series 300
Series 300
Series 300
Router
Router
Router
LocalTalk or Ethernet backbone
Wires to Router
Wires to Router
Management bus connection
Wires to management bus of next StarController

To configure a StarController hierarchy with routers:

1. Connect port 12 pins on the punchdown block for each slave StarController hub to a router.

2. Connect the routers to any available ports on the master StarController. In the following illustration, three slave StarController hubs are connected to ports 1 through 3 on the master StarController.

2. Interconnect the management bus pins on each of the StarController hubs.

3. Terminate port 12 pins for each slave StarController.

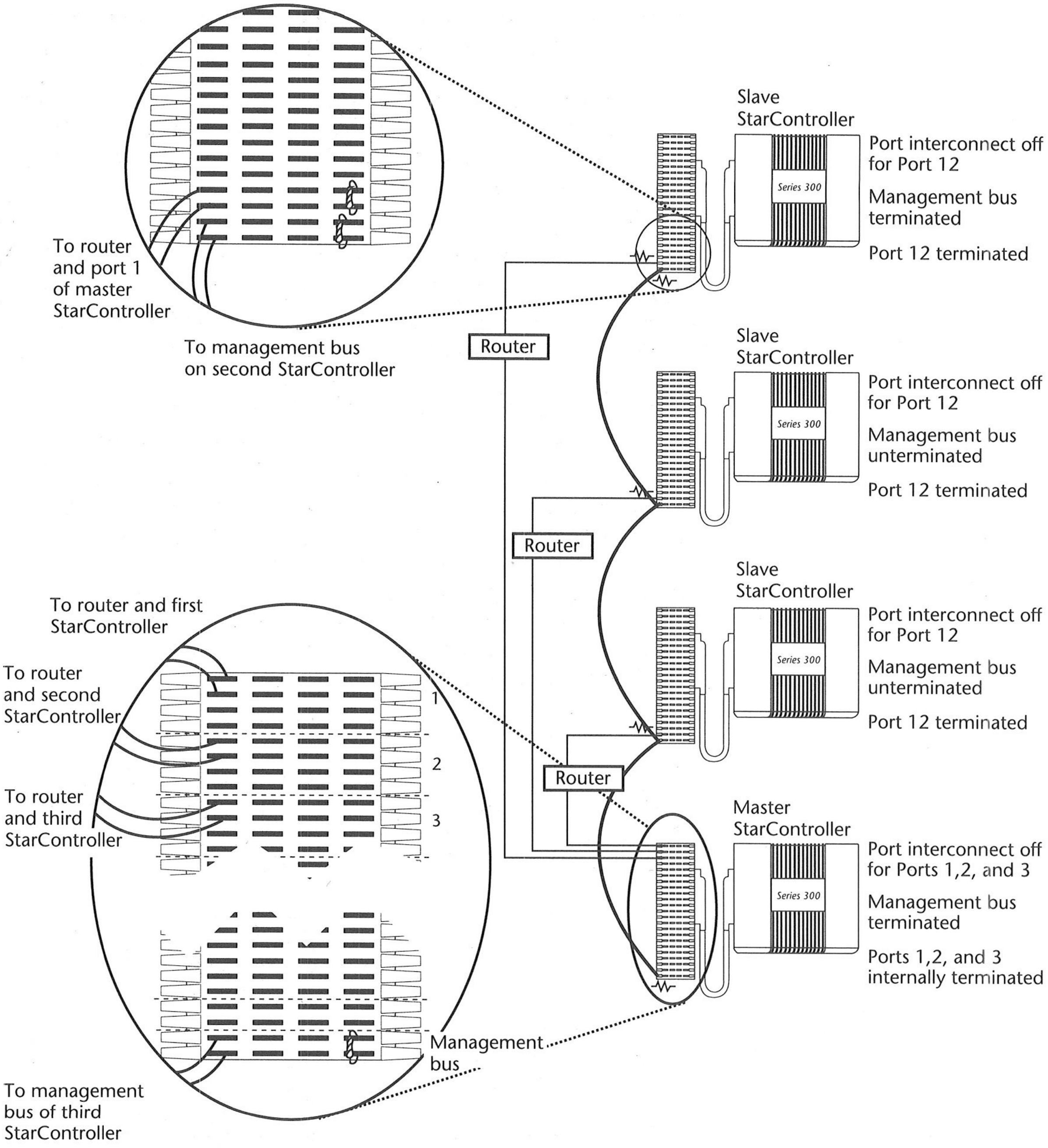
   Ports 1 through 11 on a StarController are internally terminated; there is no need to install a terminating resistor on these ports of the master StarController. However, if you are connecting a device to port 12 of the master StarController, be sure to terminate this port.

4 Terminate the management bus pins on the StarController hubs at each end of the bus.

5. Configure port interconnect for a StarController hierarchy.

   - Switch port interconnect off for the interconnected ports on the master StarController.

   - Switch port interconnect off for port 12 of the slave StarController hubs.


Slave
StarController
Port interconnect off for Port 12
Management bus terminated
Port 12 terminated
To router and port 1 of master StarController
To management bus on second StarController
Router
Series 300
Slave
StarController
Port interconnect off for Port 12
Management bus unterminated
Port 12 terminated
Router
Slave
StarController
Port interconnect off for Port 12
Management bus unterminated
Port 12 terminated
To router and first StarController
To router and second StarController
To router and third StarController
1
2
3
Router
Master
StarController
Port interconnect off for Ports 1,2, and 3
Management bus terminated
Ports 1,2, and 3 internally terminated
Management bus
To management bus of third StarController

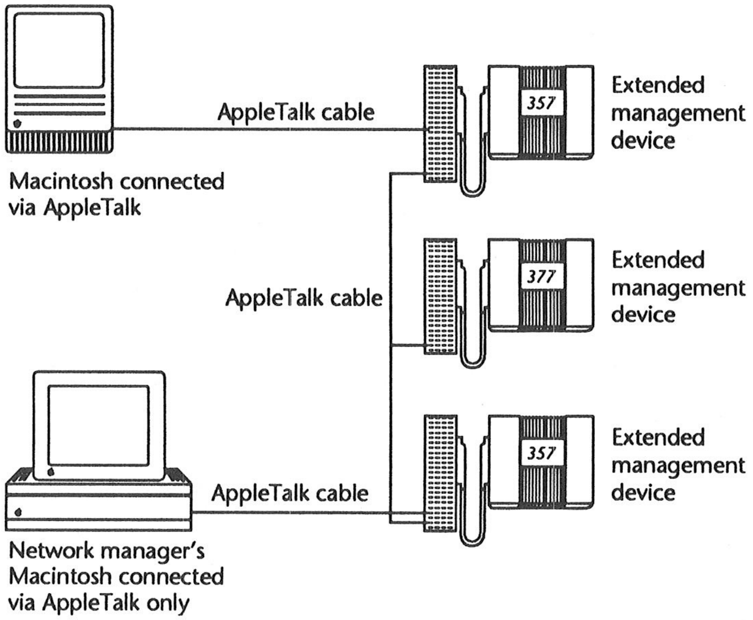
Variations on management bus wiring

The StarController/12 and /24 hubs are network-visible devices and can be managed over AppleTalk. The next three sections describe some of the different ways in which you can wire all types of hubs and still manage them.

StarController/12 and /24 hubs connected via AppleTalk only.

If your network contains only StarController/12 and /24 hubs, you do not have to interconnect the management bus between the hubs in order to manage them with StarCommand. You also do not need to connect the network manager's Macintosh with the management cable. The new hubs are network-visible devices, and can interpret StarCommand controls sent over AppleTalk.

The following illustration shows StarController/12 and /24 hubs connected via AppleTalk only. You can run StarCommand and control all hubs from any Macintosh on the network. If the AppleTalk connection should fail, you may not be able control one or more hubs. For this reason, we recommend that you interconnect the management bus between the hubs and use the management cable to connect the network manager's Macintosh to a StarController as a backup.

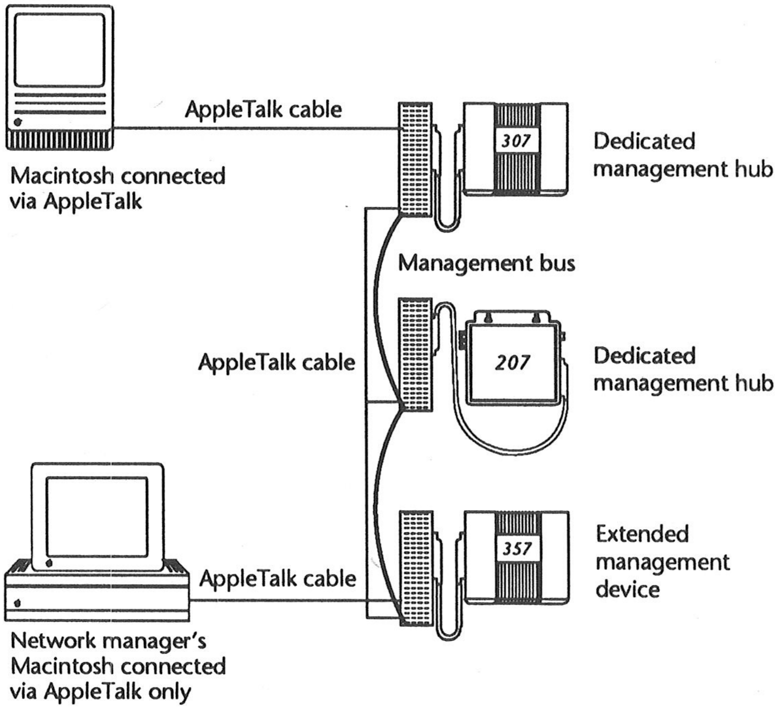

AppleTalk cable
Macintosh connected via AppleTalk
Extended management device
357
AppleTalk cable
Extended management device
377
Extended management device
357
AppleTalk cable
Network manager's Macintosh connected via AppleTalk only

StarController/12 and /24 hubs as management gateways to dedicated management hubs

If your network contains a combination of dedicated management hubs (207, 307, 407, and 507 hubs) along with new hubs, you need to wire the management bus to all dedicated management hubs. The StarController/12 and /24 hubs act as management gateways, translating the StarCommand controls from AppleTalk to the management bus. You do not need to connect the network manager's Macintosh with the management cable, although it is recommended as a backup.

The following illustration shows a 207, 307, and StarController/12 hub interconnected via the management bus. The network manager's Macintosh is connected via AppleTalk only.

You can run StarCommand and control all hubs from any Macintosh on the network. The StarController/12 hub interprets StarCommand controls sent over AppleTalk and forwards the commands to the 207 and 307 hubs over the management bus.

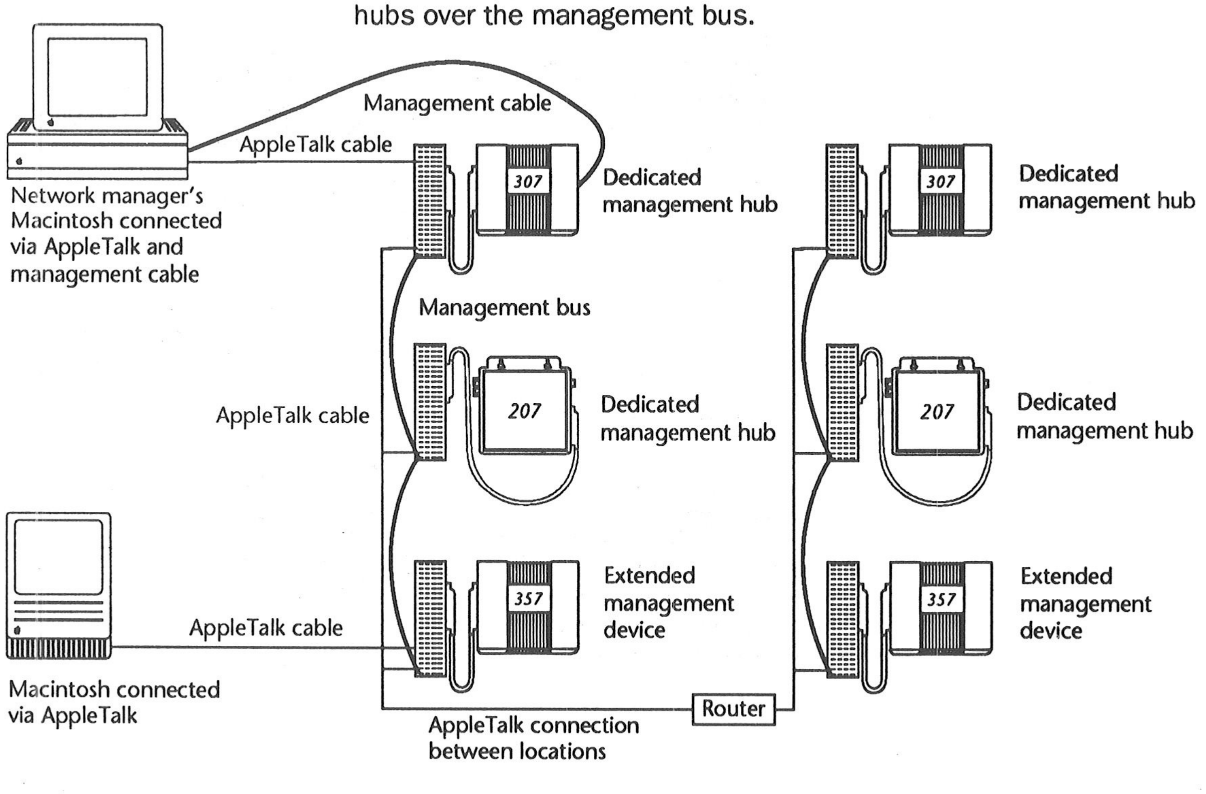


Managing networks in different places connected via AppleTalk

If your network contains LocalTalk hubs in different locations, you can still manage all the hubs with StarCommand from any single Macintosh. You do not need to have a management bus wire between the locations. To do this, you need to have an AppleTalk connection between locations. At each location you need to have a least one StarController/12 or /24 hub connected through the management bus to any dedicated management hubs.

The following illustration shows an AppleTalk connection between StarController hubs that are located in two buildings. The AppleTalk connection could be an Ethernet, LocalTalk, token ring, or a dial-up connection with modems at each end. The network at each location contains a StarController/12 or /24 hub. The management bus is connected to dedicated management hubs, and the management cable is connected from a hub to the network manager's Macintosh.

You can run StarCommand and control all hubs from any Macintosh on the network. The new hubs interpret StarCommand controls sent over AppleTalk, and forwards the controls to the 307 and 207 hubs over the management bus.


Management cable
AppleTalk cable
Network manager's Macintosh connected via AppleTalk and management cable
307
Dedicated management hub
307
Dedicated management hub
Management bus
AppleTalk cable
207
Dedicated management hub
207
Dedicated management hub
AppleTalk cable
357
Extended management device
357
Extended management device
Macintosh connected via AppleTalk
Router
AppleTalk connection between locations

Chapter 5

Using the StarController

Once you have wired the network and StarController hubs, you are ready to begin using the hubs. This chapter explains what happens when you power on a StarController, how to interpret the hub LEDs, and how to use StarCommand to verify network connections and change hub settings.

This chapter also explains how to configure the port interconnect setting manually by initiating a series of power interrupts.

Powering on devices

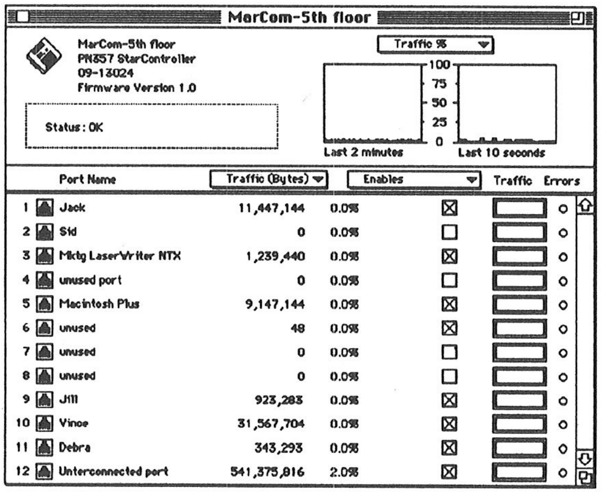
We recommend that you switch on devices in the following order: StarController hubs, routers, and then other devices. This ensures that other devices receive the correct zone information at startup. For each Macintosh, be sure that AppleTalk is switched on and LocalTalk is selected as the network connection. See the owner's manual that came with your Macintosh for details.

Interpreting hub LEDs

When you power on a StarController, it goes through a self-diagnostics startup sequence. This is described in "StarController Startup Sequence" later in this chapter. The StarController is shipped in a configuration with all ports on and begins repeating packets across all ports as soon as the startup sequence completes. A Port LED flashes as the port receives packets. The flashing LEDs are an especially helpful way to verify network connections when you are in the wiring closet and you don't have immediate access to a Macintosh to run StarCommand.

Using StarCommand to verify connections and change hub settings

The *StarCommand User's Guide* explains how to use StarCommand to verify network connections and change hub settings. The first time you run StarCommand, a list of hubs should appear in the Device List. If no hubs appear, see "Troubleshooting" in the *StarCommand User's Guide*. The Port List window for StarController/12 and /24 hubs shows the names of devices attached to a port and the amount of traffic received on the port.



MarCom-5th floor

MarCom-5th floor
PN357 StarController
09-13024
Firmware Version 1.0

Status: OK

	Port Name	Traffic (Bytes)		Enables	Traffic	Errors
1	Jack	11,447,144	0.0%	☒		○
2	Sid	0	0.0%	☐		○
3	Mktg LaserWriter NTX	1,239,440	0.0%	☒		○
4	unused port	0	0.0%	☐		○
5	Macintosh Plus	9,147,144	0.0%	☒		○
6	unused	48	0.0%	☒		○
7	unused	0	0.0%	☐		○
8	unused	0	0.0%	☐		○
9	Jill	923,283	0.0%	☒		○
10	Vince	31,567,704	0.0%	☒		○
11	Debra	343,293	0.0%	☒		○
12	Unterconnected port	541,375,816	2.0%	☒		○

If devices don't appear in the Port List Window, check the following:

- Wall jack wiring and termination
- Device switched on
- Device properly configured with AppleTalk on and LocalTalk selected as the network connection.

If your network has multiple hubs, it's also a good idea to confirm the port interconnect settings. Port interconnect should be switched off for all ports except those ports connected directly to another StarController. See "Switch Port Interconnect On When Directly Interconnecting StarController Hubs" in Chapter 4 for details.

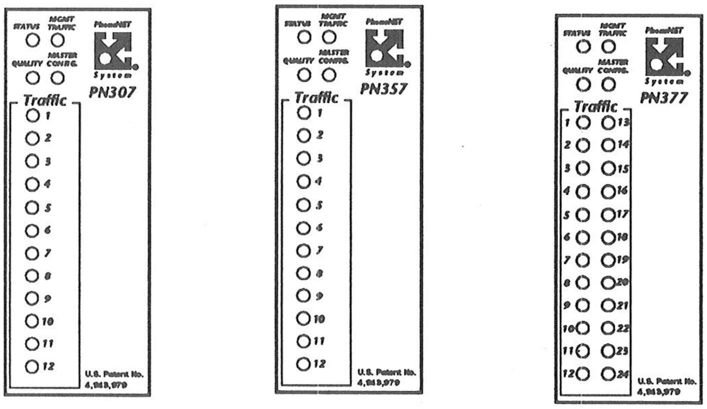
StarCommand has many additional features to help you manage your network. We recommend that you run StarCommand once a day or whenever necessary to monitor network activity.

StarController LEDs

The StarController has LEDs that help you monitor the functioning of the StarController and traffic activity on the network. There is an LED for each port, and four LEDs to summarize the total activity on the hub. The LEDs indicate when:

- The StarController passed diagnostics.
- An excessively long packet (jam) is received.
- Multiple short packets (fragments) are received.
- The network manager is running StarCommand.
- The StarController is configured as a master or slave.
- Packets are received by a port.
- The StarController is being reprogrammed.

The 307 and StarController/12 (357) hubs have 16 LEDs, one LED for each of the 12 ports and four LEDs to show hub activity. The StarController/24 (377) hub has 28 LEDs, one LED for each of the 24 ports and four LEDs to show hub activity.



StarController LEDs

The LEDs have an additional mode indicating reprogram failure. In the unlikely event that this condition should occur, the LEDs begin to flash one at a time from one side of the hub to another. Call Farallon Technical Support for assistance.

Self-diagnostics

When you switch on the StarController, it performs self-diagnostics that last for about 1 second. During this time the Status and Quality LEDs glow red and the remainder of the LEDs glow green.

Startup interval

The Status LED then flashes red and green for about 5 seconds. This phase is called the startup interval. Then the port LEDs for ports which are switched on glow green. During the startup interval you also have the opportunity to configure the port interconnect settings by initiating a series of power interrupts. See "Configuring Port Interconnect Manually" later in this chapter for details. If the StarController fails diagnostics, the Status LED glows red.

Normal operation

Upon completion of the startup interval, the Status LED glows green, the Quality LED glows green, and the Master Configuration LED glows green if the StarController is configured as a master.

Under normal operation, the Port LEDs begin flashing as the ports receive packets. If the network manager runs StarCommand, the Management LED flashes green.

Autopartitioning of ports

The StarController autopartitions (or shuts off for 5 seconds) any ports that receive an excessively long packet transmission or excessive fragments. See the Appendix A, "Technical Specifications," for the exact conditions when autopartitioning occurs.

The Quality LED glows red if a port has been autopartitioned due to an excessively long packet transmission. The LED of the autopartitioned port glows green.

The Quality LED blinks red and green if a port has been autopartitioned due to excessive fragments. The LED of the autopartitioned port glows green.

If a port is continually autopartitioned, you should determine the source problem by checking devices and connectors attached to the port. You may have to reset the device or replace the PhoneNET connector.

LED Name	LED color/state	Explanation
Status	steady red	Failed diagnostics. Call Farallon Technical Support.
	blinking red and green	Startup interval in progress. During this time, the LEDs for all ports that are switched on glow green. You have the opportunity to initiate a power interrupt sequence in order to reconfigure the ports.
	steady green	Passed diagnostics, all OK.
Quality	steady red	A port has been autopartitioned due to an excessively long packet transmission. The LED of the source port glows green.
	blinking red and green	A port has been autopartitioned due to excessive fragments. The LED of the source port glows green.
	steady green	All OK.
Management Traffic	blinking green	Traffic on management bus has been detected, caused by running StarCommand.
Master Configuration	steady green	Port Interconnect is switched on for all ports. The StarController should only be used as a master hub when this light is green. Discussed in Chapter 4.
	off	One or more ports have Port Interconnect switched off.
Port Traffic	blinking green intermittently	Traffic on the port has been detected, normal packets are being received by the port.
	steady green	Port autopartitioned.
	off	Port switched off or no traffic currently detected on the port.

Configuring port interconnect manually

You can change the port interconnect settings by initiating a series of power interrupts (momentary breaks of power) when plugging in the StarController. It is easier to use StarCommand to change Port interconnect settings; however, you may find it useful to change manually configure port interconnect settings when troubleshooting or replacing a StarController. This is accomplished by manually plugging in and removing the power supply lead from the StarController. You can also use a power strip to turn the power on and off.

- Initiating two power interrupts switches all ports on and configures port interconnect off for ports 1-11, and port interconnect on for port 12. The StarController is shipped with this configuration, which is sometimes referred to as the "slave" configuration.

  StarController/24 hub: Initiating two power interrupts also configures port interconnect off for ports 13-24.

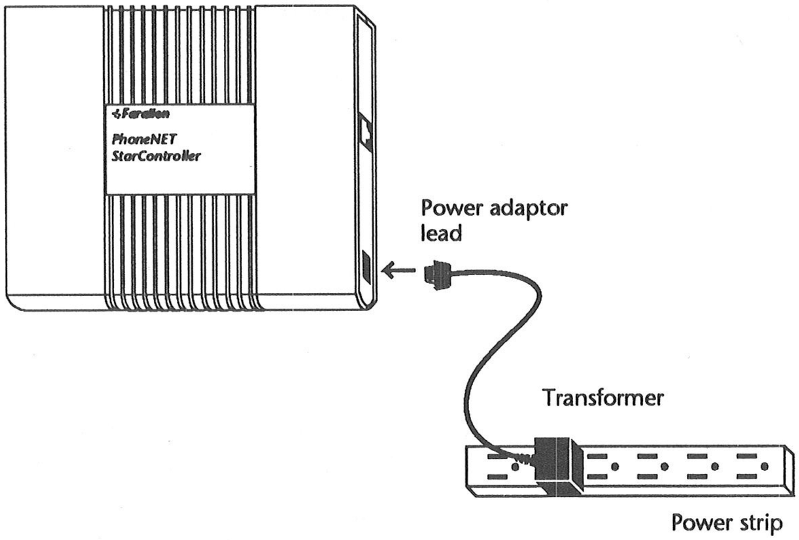
- Initiating three power interrupts switches all ports on and configures port interconnect on for all ports. The Master LED glows green.

To configure port interconnect manually:

1. Prepare to power on the StarController.

   If you have a power strip, turn the power off and plug in the StarController transformer. Plug the power supply lead next to the StarController

   If you don't have a power strip plug the StarController transformer into the wall outlet. Hold the power supply lead next to the StarController.



2. Power on the StarController and watch the LEDs.

   Switch on the power strip or plug the power supply lead into the StarController power adaptor socket and watch the Status LED. It should glow red for about 1 second and then begin flashing red and green and remain flashing for about 5 seconds.

3. While the Status LED is flashing, power off the StarController by switching off the power strip or removing the power supply lead.

4. To configure port interconnect off for all ports except port 12, perform one more power interrupt. In other words, repeat steps 2 and 3 one more time.

   To configure port interconnect on for all ports (master configuration), perform two more power interrupts. In other words, repeat steps 2 and 3 two more times.

5. Finally, power on the StarController and leave it on. If you have configured the StarController as a master, the Master LED will glow green.

Appendix A

Technical Specifications

Hardware specifications

Physical dimensions

Size:	8.25" (l) x 10.5" (w) x 1.75" (d) 21 cm (l) x 26.7 cm (w) x 4.5 cm (d)
Weight:	2 lbs. (4.4 kg)

Power

AC input voltage:	90 to 135 VAC
AC input frequency:	47 to 440 Hz
AC input current:	0.12 amps @ 120 VAC
AC input power:	15 Watts

Environmental characteristics

Operational temperature:	+50° to +95° F (+10° to +35° C)
Relative humidity:	less than 90% non-condensing

Signaling

Media:	Shielded or unshielded twisted-pair cable 75- to 150-ohm impedance
Signaling standard:	EIA modified RS-422, balanced voltage
Signaling speed:	230.4 kbps. The StarController is speed-independent and can support network signal rates up to 1 Mbps.
Signal encoding:	FMO (bi-phase)
Frame format:	SDLC (Synchronous Data Link Control)

Firmware specifications

Counter sizes

	307 hub	StarController/12 and /24 hubs
Total traffic:	24 bits	32 bits
Port traffic:	24 bits	32 bits
Port errors:	16 bits	16 bits

Settings stored in non-volatile memory

Port interconnect setting: 12/24 bits

Port on/off status: 12/24 bits

AppleTalk ID: 8 bits (StartController/12 and /24 hubs)

Node name: 18 or 32 bytes (StartController/12 and /24 hubs)

Autopartitioning of ports

The StarController autopartitions, or shuts off for 5 seconds, any ports that receive an excessively long packet transmission or excessive fragments. The port interconnect setting controls a port's tolerance to fragments or jams.

With port interconnect off, a port is autopartitioned and a jam is reported when any packet longer than 50 milliseconds is received. With port interconnect on, a port is autopartitioned and a jam is reported when a packet longer than 250 milliseconds is received.

A fragment is a packet less than 56 bits long. With port interconnect off, a port is autopartitioned when 12 consecutive fragments are received within 100 milliseconds. With port interconnect on, a port is never autopartitioned for fragments.

Line test

When a line test is initiated, the hub sends 100 microseconds of test packets across the line and measures how long the line takes to settle. The process is repeated four times. A number proportional to the settling time is shown along with a potential evaluation of line termination status.

Other hub specifications

Bit error rate less than 1 in 10,000,000
Speed on management bus: 9600 bps
Microprocessor controller: Intel 8031

Regulatory notices

FCC approval

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Deutschland

Hiermit wird bescheinigt, das PhoneNET StarController Series 300 PN357 und PN377 in Übereinstimmung mit den Bestimmungen der Vfg 1046/1984 funk-enstört ist.

Der Deutschen Bundespost wurde das Inverkehbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmung eingeräumt.

Farallon Computing, Inc.
2000 Powell Street
Emeryville, CA 94608 USA

Germany

We hereby certify that the PhoneNET StarController Series 300 PN357 and PN377 complies with the RFI suppression requirements of Vfg 1046/1984.

The German Postal Service was notified that the equipment is being brought to market. The German Postal Service has the right to re-test the equipment and verify compliance.

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

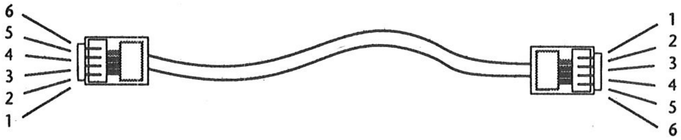
Appendix B

Pin Assignments

Note: The RJ-45 and RJ-11 connector tabs in the following diagrams are face down.

RJ-11 cable

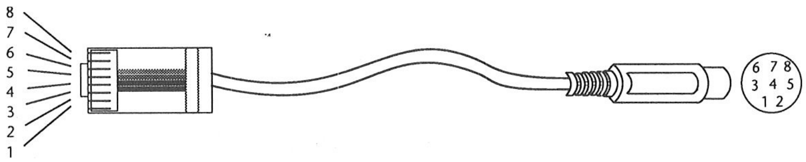
- Connects a workstation or device to an RJ-11 wall jack.
- Cross-connects patch panels.



RJ-11		RJ-11
2	–	2
3	–	3
4	–	4
5	–	5

Management cable

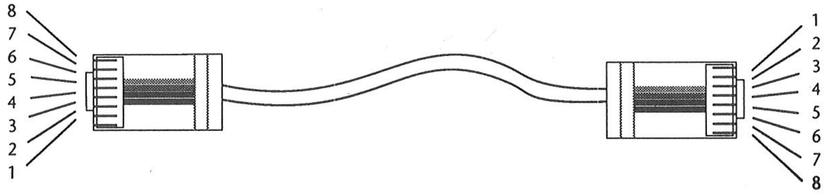
- Connects a network manager's Macintosh to a StarController management cable connection or RJ-45 wall jack.



RJ-45		mini-DIN-8
6	–	5 RxD-
5	–	4 Ground
4	–	4 Ground
3	–	3 TxD-

Management link extension cable

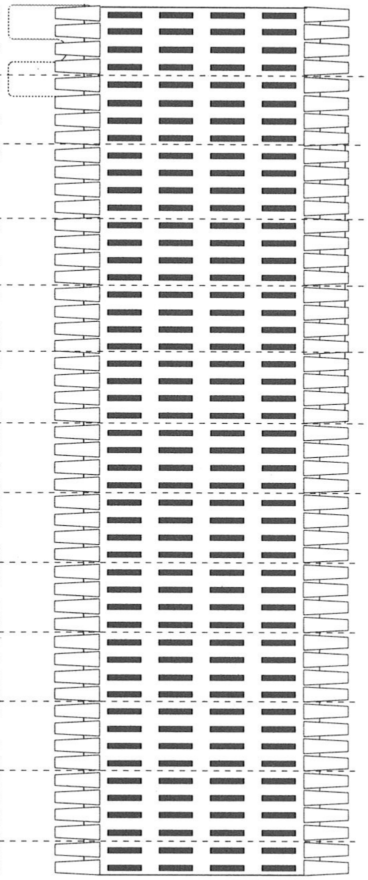
- Connects an RJ-45 wall jack to the StarController management cable connection.



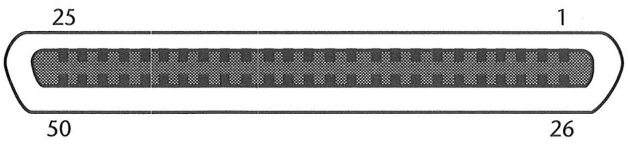
RJ-45		RJ-45
8	–	8
7	–	7
6	–	6
5	–	5
4	–	4
3	–	3
2	–	2
1	–	1

Punchdown block pin assignments

Port #	Wire pair	RJ-21 pin number
13	1	26 1
1	2	27 2
14	3	28 3
2	4	29 4
15	5	30 5
3	6	31 6
16	7	32 7
4	8	33 8
17	9	34 9
5	10	35 10
18	11	36 11
6	12	37 12
19	13	38 13
7	14	39 14
20	15	40 15
8	16	41 16
21	17	42 17
9	18	43 18
22	19	44 19
10	20	45 20
23	21	46 21
11	22	47 22
24	23	48 23
12	24	49 24
Management port	25	50 25



RJ-21 connector pin assignments



Appendix C

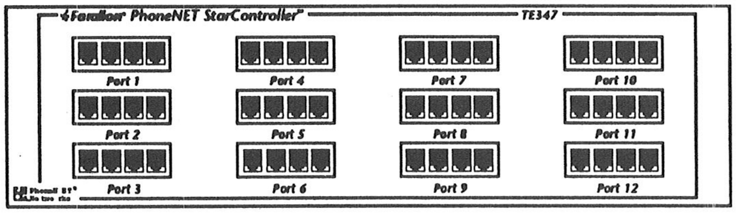
Connecting a Patch Panel or Harmonica Block

You can use the StarController with a patch panel or harmonica block instead of a punchdown block. These distribution blocks are available as wiring kits from Farallon.

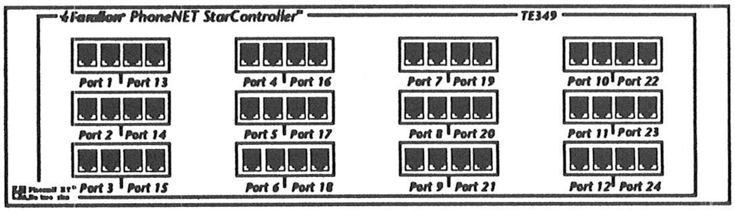
Patch panel

A patch panel is a rack-mountable wiring distribution block with 48 standard RJ-11 sockets. The patch panel makes network reconfigurations easy. Farallon provides two different LocalTalk patch panels:

- TE347 is designed for use with the 307 and StarController/12 hubs. You can attach up to four devices per port.

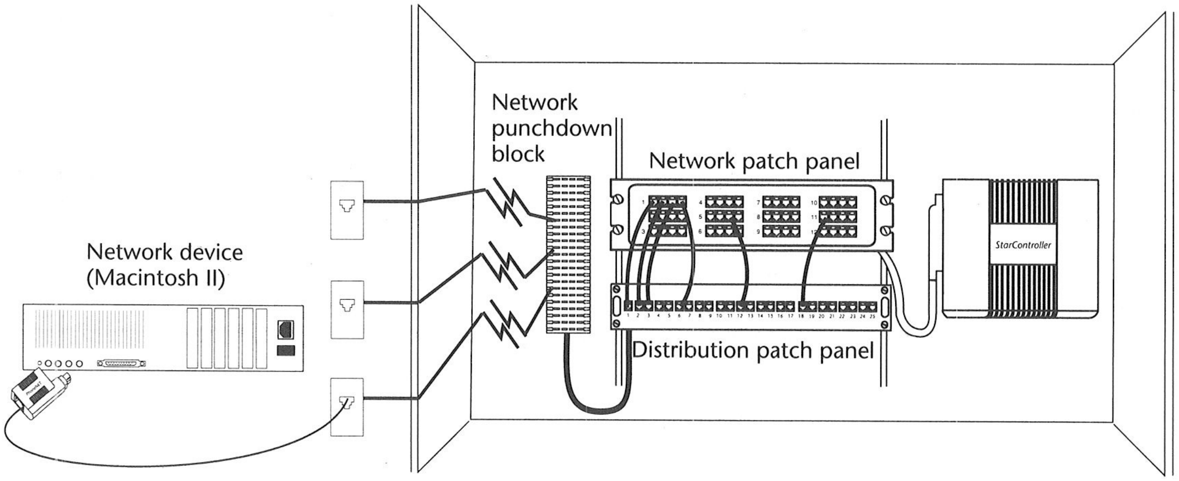


- TE349 is designed for use with the StarController/24 hub. You can attach up to two devices per port.



To connect a patch panel:

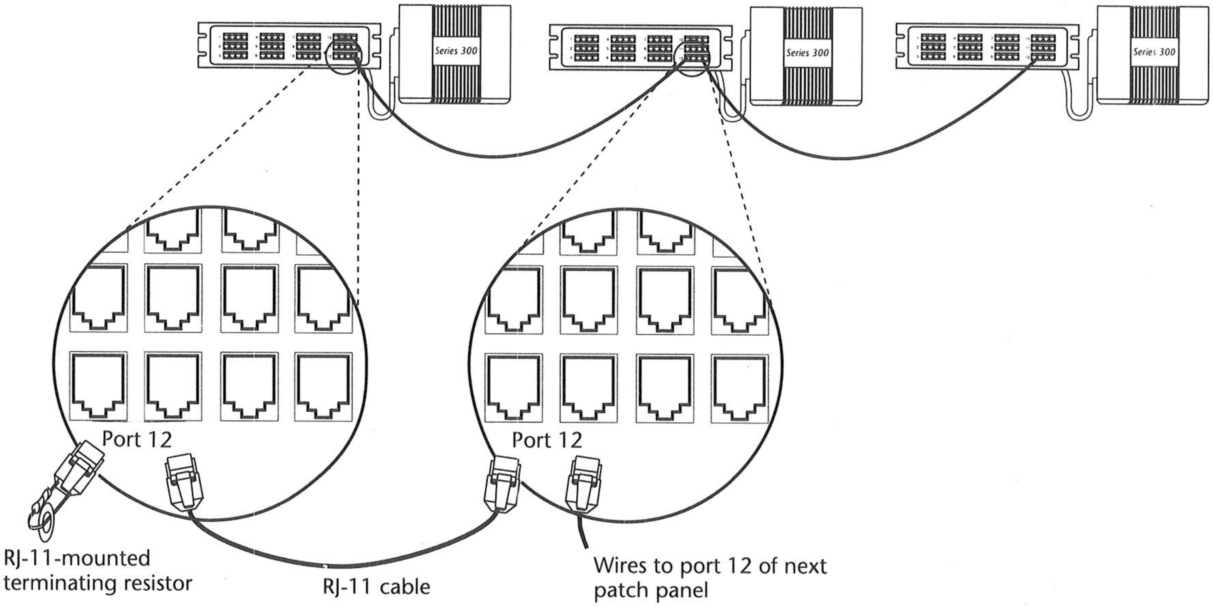
1. Wire the wall jacks, network punchdown block, and distribution patch panel.
2. Mount the network patch panel on a standard 19" rack.
3. Connect the patch panel to the StarController using the RJ-21 cable.
4. Use RJ-11 cables to cross-connect the network patch panel and distribution patch panel.



A StarController connected to a network patch panel

To interconnect port 12 on two patch panels

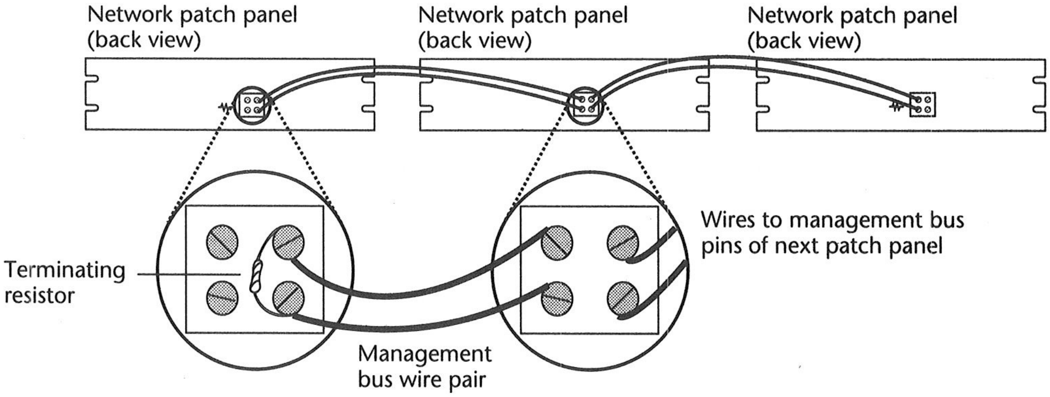
Use an RJ-11 cable to cross-connect port 12 on two network patch panels. Since each network patch panel has four RJ-11 jacks, you can easily daisy chain multiple patch panels. Use an RJ-11–mounted terminating resistor into port 12 of the patch panel at each end of a StarController backbone.


Series 300
Series 300
Series 300
Port 12
Port 12
RJ-11-mounted terminating resistor
RJ-11 cable
Wires to port 12 of next patch panel

Interconnecting port 12 between two network patch panels

To interconnect the management port on two patch panels:

The network patch panel has screw lugs on the back that are connected to the management bus. Connect the management bus wire pair to the screw lugs on each network punchdown block. Install a terminating resistor between the screw lugs for the network patch panels at each end of the StarController backbone.

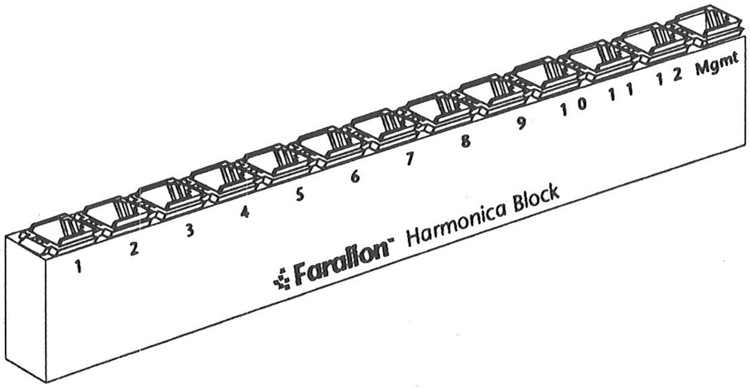


Interconnecting and terminating the management bus between two network patch panels

Harmonica block

The harmonica block is smaller version of a network patch panel and has 13 RJ-11 jacks. It is useful if your network uses distribution patch panels and you would like to connect one device per port. You can also use a harmonica block to create a temporary network.

The harmonica block was designed to be used with the StarController/12 hub or older StarController hubs that have 12 ports.



Appendix D

StarController Series 300 Hubs and the Farallon Concentrator

The StarController Series 300 hubs are available in two configurations: the stand-alone wall-mounted version, and the plug-in version used with the Farallon Concentrator. This appendix is a brief overview of how to modify a stand-alone StarController hub for use as a Farallon Concentrator plug-in unit, and how to install a StarController plug-in unit in the Concentrator.

▶ **Important:** Please follow the detailed instructions contained in the *Farallon Concentrator Installation and Configuration Guide* unless you have recently installed other Series 300 StarController hubs into Farallon Concentrators.

Preparing a stand-alone hub for use in the Concentrator

A stand-alone hub, also referred to as case-mounted or wall-mounted, is a hub encased in plastic with no visible circuit boards. To use such a hub in a Farallon Concentrator, you must remove the plastic case and install a front panel made for use with the Concentrator. This front panel provides both a surface for the LED label overlay and screws that help the hub stay in firm electrical contact with the Concentrator. Here are the general steps you must follow to convert your stand-alone hub to a plug-in unit for the Concentrator. (See the *Farallon Concentrator Installation and Configuration Guide* for more detailed instructions.)

1. Gather the following items that were shipped with your Farallon Concentrator: one #6 x 3/8-inch and two #4 x 1/2-inch self-tapping screws (from the mounting hardware package), and a blank serial number label.

2. If the hub you are about to modify is currently in use, warn the users that their network service will be interrupted. Next, unplug the hub's power cable, then disconnect all other cables from the hub.

3. If the hub is wall-mounted, slide it off its mounting bracket. Open the plastic case by pressing the ribbed tabs on the sides of the hub, or by prying gently with a screwdriver.

4. On an antistatic work surface, remove the velcro and velcro clip surrounding the RJ-21 connector by removing the two screws.

5. Remove the circuit board assembly from the plastic case by removing the four mounting screws and then removing the two plastic end pieces. Locate the hub serial number (which has the format 03-XXXXX) on one endpiece, and record it on your blank serial number label. Remove the LED label overlay from the other endpiece and save it for use in Step 8.

6. Choose an unused Concentrator slot for the hub. Remove the Concentrator top cover and then the chosen slot's blank front panel. If a cable cover is attached to the front panel, remove it and set it aside for now.

7. Line up the LEDs with the LED apertures in the panel and then attach the front panel to the circuit card using the self-tapping screws. Use the #6 x 3/8-inch screw to attach the circuit board assembly to the front panel bracket near the top of the panel, above the LEDs. Use one of the #4 x 1/2-inch screws to attach the front panel to the RJ-21 connector assembly near the bottom of the panel. If your LocalTalk network connection will be made through a harmonica block, use the third screw to attach the front panel to the RJ-21 connector assembly, near the top of the RJ-21 assembly. If your LocalTalk network connection will be made through a cable with an RJ-21 connector, do not use the third screw.

8. Place the appropriate Series 300 LED label overlay on the corresponding front panel so the LEDs are visible. Fit the overlay tabs into the slots on the front panel.

9. Place the serial number label in the recessed area near the top of the front panel.

Your hub is now ready to be configured and installed in the Farallon Concentrator.

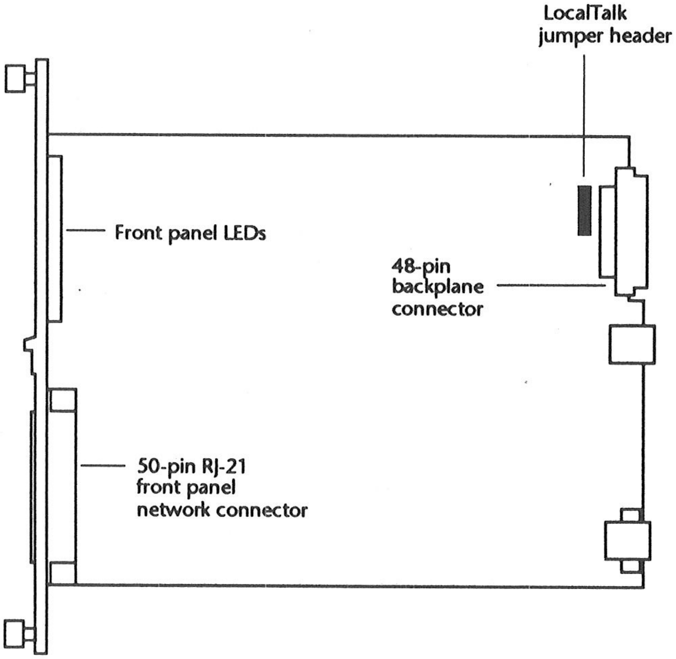
Configuring and installing a plug-in unit in the Concentrator

StarController Series 300 hubs must be configured before they are installed in the Concentrator. Instructions for the first step, setting LocalTalk jumpers, are listed below.

Set LocalTalk Jumpers

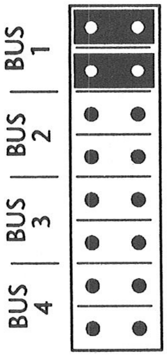
You will need to use jumpers to connect port 12 of the StarController Series 300 hub to any one of four LocalTalk buses on the Concentrator backplane. See the *Farallon Concentrator Installation and Configuration Guide* for information on buses. Follow these steps to install the jumpers:

1. Place the Series 300 hub on a clean anti-static surface.


LocalTalk jumper header
Front panel LEDs
48-pin backplane connector
50-pin RJ-21 front panel network connector

StarController Series 300 hub circuit card layout

2. Series 300 hubs are shipped with a pair of jumpers connected to Bus 1. If you do not want this particular hub connected to LocalTalk 1, remove this pair of jumpers now.



LocalTalk jumper on a Series 300 hub

3. Install jumper pairs on the LocalTalk pins and corresponding LocalTalk bus you want connected to port 12. Be certain both jumpers are on pins to the same bus.

▶ **Note:** Never connect a LocalTalk hub to more than one LocalTalk bus on the Concentrator's backplane. Only one pair of jumpers should be installed on a LocalTalk hub at any given time.

After ensuring that there is only one pair of jumpers installed on the hub, follow the hub installation procedures to install the Series 300 hub in the Concentrator.

Installing a plug-in unit in the Concentrator

The general steps you must follow to install a plug-in Series 300 StarController hub in the Concentrator are listed below. These instructions apply regardless of whether or not the hub was previously used as a stand-alone unit. (See the *Farallon Concentrator Installation and Configuration Gude* for more detailed instructions.)

▶ **Note:** You do not need to turn the Concentrator off to install a hub.

1. Verify that the necessary network cable or cables can reach and connect to the hub when it is installed in the Concentrator. Verify that the jumpers are set to the correct LocalTalk bus. (See the previous section for details on setting jumpers.)

2. Slide the plug-in unit into the chosen slot in the Concentrator. Push gently but firmly. The 48-pin connector on the plug-in unit should make firm electrical contact with a 48-pin socket on the Concentrator backplane. Tighten the thumbscrews on the front panel. Observe the LEDs on the unit: the Series 300 hub should go through its normal startup sequence if the Concentrator power is on.

3. If the startup sequence completes normally, and the hub needs to be configured, use StarCommand. If the hub was previously configured, the configuration information should already be in place, and you can skip this step.

   If the startup sequence does not complete normally, try resetting the hub. You can do this either by using the recessed reset button on the Concentrator Interface Module (which will reset all hubs in the Concentrator), or by removing the hub from the Concentrator and re-inserting it. Normally you would be able to select the hub in the StarCommand Device List window and use the Reset Device command, but a hub that has not completed the startup sequence will not appear in the StarCommand Device List. If a hub fails the startup sequence twice in a row, call Farallon Customer Service for help in resolving the problem.

4. When the hub has completed startup normally, and has been configured, connect the RJ-21 cable and screw in the top screw. Replace the cable cover, or connect the LocalTalk integrated patch panel and modular cables, and then reinstall the top cover of the Concentrator.

5. Turn on all LocalTalk devices connected to the hub, if you have not already done so. Use StarCommand to reset the hub. When the reset is complete, the hub should operate normally.

Appendix T

Farallon Technical Support

Farallon Computing is committed to providing its customers with reliable products and documentation, backed up with excellent technical support.

Before calling Farallon

Look in this user's guide for a solution to your problem. Check the index for a reference to the topic of concern.

Environment Profile

Before calling Farallon, find out the following information:

- Locate your product serial number. (Look for the serial number label on the hub's faceplate.)

  Serial number: ______________________________

- On what model StarController are you experiencing the problem?

  ☐ StarController/12 (PN357)

  ☐ StarController/24 (PN377)

  ☐ Other StarController(s): ______________________

  ____

- What type of wire are you using for your network cabling?

  ____

- How many devices are connected to the StarController? ____

How is the network terminated?

Environment Profile (continued)

- What kind of network(s) do you have?
  - ☐ LocalTalk, daisy chain
  - ☐ LocalTalk, bus (backbone)
  - ☐ LocalTalk, passive star
  - ☐ LocalTalk, active star
  - ☐ Ethernet, twisted pair
  - ☐ Ethernet, thin coax
  - ☐ Ethernet, thick coax
  - ☐ Other: ____________________________________

- If you are having difficulty controlling your hub from StarCommand software, on what kind of Macintosh do you encounter the problem (for example, an SE or a IIsi)? What System software are you using on this Macintosh (for example, System 6.0.7 or System 7.0)? What version of StarCommand are you using (such as 3.0)? (In the Finder, select About This Macintosh from the Apple menu. Run StarCommand and select About StarCommand from the Apple menu.)

  Macintosh ________________________

  System __________________________

  StarCommand version _____________

How to reach us

We can help you with your problem more effectively if you have completed the Environment Profile in the previous section and are at the site of the problem, prepared to reproduce it and to try some troubleshooting steps.

When you are prepared, contact Farallon Customer Service by telephone, fax, or mail at:

Phone: (510) 596-9000
Fax: (510) 596-9023

Farallon Computing
Customer Service
2000 Powell Street, Suite 600
Emeryville, California 94608
USA

You can also contact us via the following network services:

America Online (ID: FARALLON)
AppleLink (ID: FARALLON)
CompuServe (ID: 75410,2702)
Internet (ID: farallon@farallon.com)

Product information and technical notes can be found in the Farallon bulletin boards on America Online and AppleLink, on CompuServe in Macintosh Vendor C Forum, and on Internet via anonymous FTP to farallon.com (192.100.87.10).

If you are located in Europe or the Pacific Rim, you can get service locally by contacting your nearest Farallon reseller or distributor. For a worldwide list of our distributors, see our AppleLink bulletin board or the back page of our product catalog

Glossary

AppleTalk: Protocols that allow Macintosh computers to communicate with printers, file servers, and other devices.

backbone: A network topology consisting of a single length of cable with multiple network connection points.

branch: A length of cable in a star network that goes from the center of the star to a wall jack.

dedicated management hub: A device that does not have an AppleTalk node name or address and is transparent to the network. The StarController 207, 307, 407 and 507 hubs can be managed through the management bus only.

Ethernet: A set of standards defining a type of local area network characterized by a data rate of 10 Mbps.

extended management device: A device that has a node name and address, and can be controlled over AppleTalk. The StarController/12 and /24 hubs are extended management devices.

firmware: Software stored in a device's memory that controls the device. The firmware on an extended management device can be reprogrammed.

LocalTalk: The cabling specification for AppleTalk running at 230.4 kbps.

management bus: A pair of wires running between the management ports on multiple StarController hubs. The management signals are carried over this wire pair.

management cable: A cable with an RJ-45 connector at one end and a mini-DIN-8 connector at the other. This cable is used to directly attach the management port on a device to the modem or printer port on the network manager's Macintosh.

management gateway: A device that can translate StarCommand controls from AppleTalk to the management bus. The StarController/12 and /24 hubs are management gateways.

model number: A number that identifies a device, such as PN207, PN307, or PN357.

mounting plate: A bracket used to mount the StarController on a wall.

network-visible device: A device that has an AppleTalk node name and address, and can be managed over AppleTalk. The StarController/12 and /24 hubs are network-visible devices.

network log: A record of the names of devices, location of wire pairs, wall-jack numbers, and other information about the network.

network manager: A person who coordinates the design, installation, and management of a network. A network manager is also responsible for adding new users to the network and for troubleshooting.

network map: A visual record of your network configuration. A network map usually includes a floorplan diagram and graphics representing devices and cabling.

network topology: The physical layout of network devices. Network topologies include backbone and star.

ohm meter: A device that measures the resistance of electrical current flowing through a wire.

PhoneNET connector: A hardware unit that attaches a LocalTalk device such as a Macintosh to twisted-pair wiring. The PhoneNET connector has two RJ-11 jacks and is not pre-terminated. *See also* StarConnector.

port interconnect: A setting that controls a port's tolerance to fragments and excessively long packet transmissions.

PhoneNET System: A network solution that includes a complete line of LocalTalk hardware and software products to help you build your networks, manage them, and use them to their full potential.

punchdown block: A wall-mounted telephone wiring distribution block used to connect many pairs of wires.

punchdown tool: A tool used by telephone installers to attach wires to a punchdown block.

repeater: A device that rebroadcasts a network signal, allowing it to travel for longer distances. Repeaters have little or no effect on the speed of a network signal.

RJ-11: A telephone-industry standard connector type usually containing four pins.

RJ-21: A standard 50-pin connector type. Also referred to as "Champ" or "Amphenol." An RJ-21 cable included in the StarController wiring kit is used to connect a StarController to a network punchdown block, patch panel, or harmonica block.

RJ-45: A telephone-industry connector type usually containing eight pins.

router: A device that isolates traffic within specific sections of the network and forwards traffic destined to other sections of the network.

star: A network topology where wires run from centrally located wiring closets to office wall jacks throughout a building.

StarConnector: The basic hardware unit that attaches a device to the network. The StarConnector has an RJ-11 jack and a DIN-8 plug and is pre-terminated.

StarController hub: A multi-port repeater for Ethernet or LocalTalk networks.

telephone wall cable: 2-pair, 4-pair, or 8-pair, 22- or 24-gauge solid copper wire cable. Telephone wall cable is sometimes called telephone station cable or twisted-pair cable.

terminating resistor: A small electrical component used to properly balance the electrical signal by adding resistance to the end of a length of cable.

trunk: *See* backbone.

wall jack: A small hardware component used to tap into telephone wall cable. An RJ-11 wall jack usually has four pins; an RJ-45 wall jack usually has eight pins.

wiring closet: A central location where a building's telephone and network wiring is connected. Multi-story buildings often have a main wiring closet in the basement and satellite wiring closets on each floor.

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Hardware Limited Warranty and Limitation of Remedies

Farallon warrants to you, the end user, that the enclosed Farallon hardware product (the "Product") will, unless modified by you, perform substantially the functions described in the user documentation provided by Farallon with the Product and will be free from defects in materials and workmanship under normal use. This warranty will expire one (1) year from date of purchase for all Products other than LocalTalk network connectors, which carry a lifetime warranty, and Ethernet cards, which carry a five (5) year warranty from date of purchase.

Farallon does not warrant that the Product will meet your requirements or that operation of the Product will be uninterrupted or error-free. Farallon is not responsible for any problem or malfunction caused by (i) changes in the operating characteristics of computer hardware or computer operating systems which are made after the release of the Product, (ii) interaction of the Product with non-Farallon hardware or software, or (iii) accident, abuse, or misapplication.

Farallon's entire liability and your sole remedy under this warranty during the warranty period is that Farallon shall, at its sole and exclusive option, either replace the Product with a functionally equivalent product at no charge to you or refund the purchase price of the Product. Any replacement Product will be warranted for the remainder of the original warranty period or ninety (90) days, whichever is longer.

In order to make a claim under this warranty you must comply with the following procedure:

1. Contact Farallon Customer Service within the warranty period to obtain a Return Materials Authorization ("RMA") number.

2. Return the defective Product and proof of purchase, shipping prepaid, to Farallon with the RMA number prominently displayed on the outside of the package.

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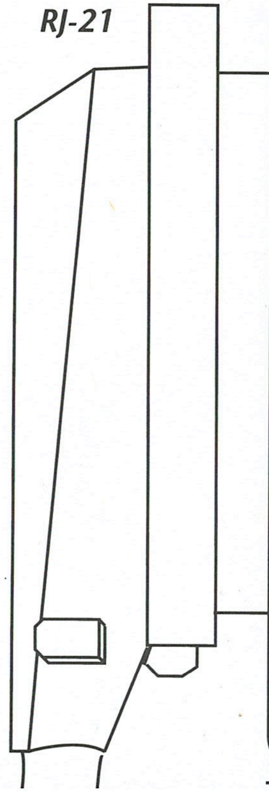
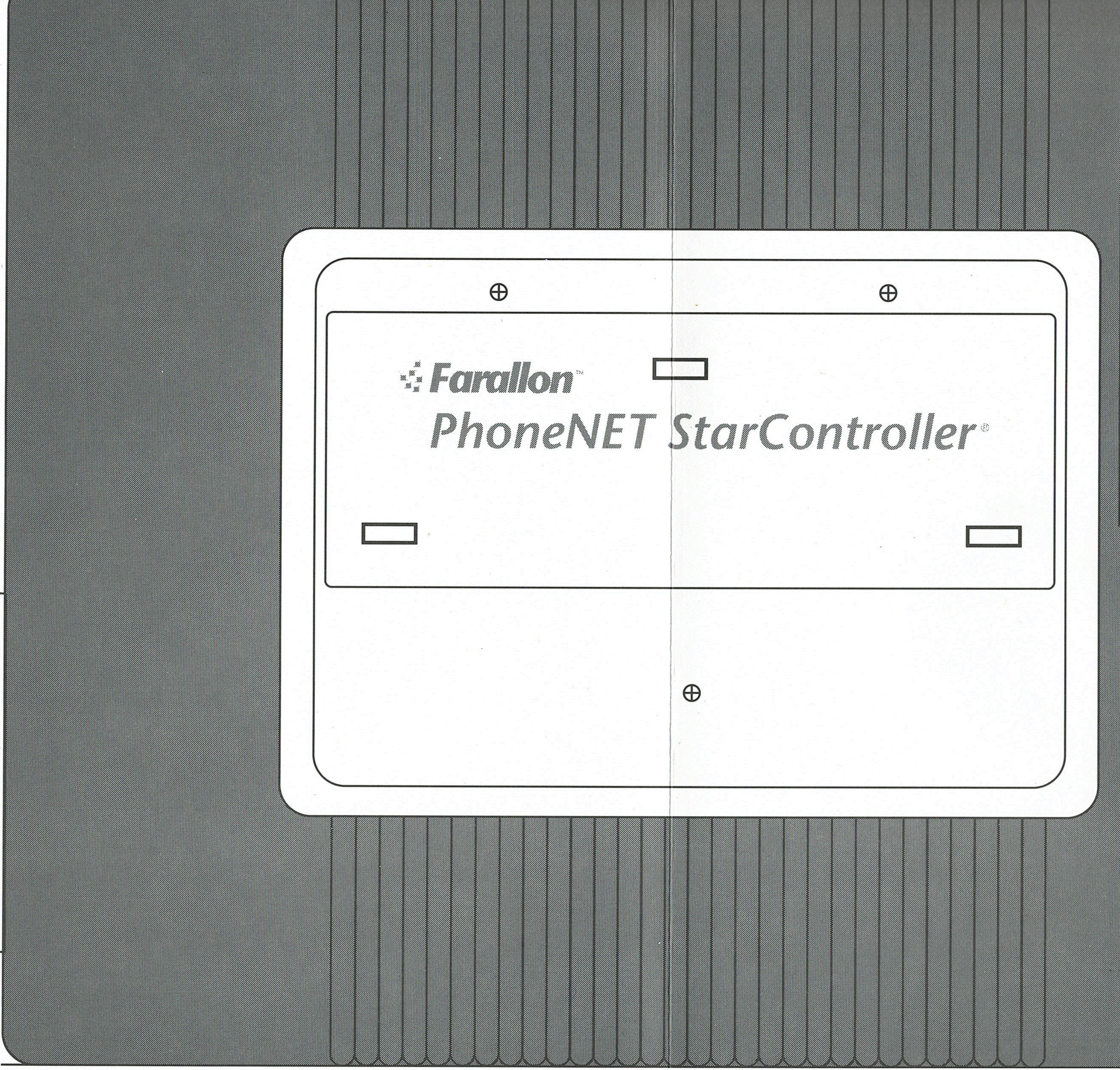
Instructions:

1. Decide which wall in the wiring closet you will use to install the StarController hubs.

2. Hold the template against the wall.

3. Use a pencil or pen to mark the wall at the corners of the template. Note that the area you have marked is intentionally larger than the StarController—allowing room for the RJ-21 and power adaptor cables.





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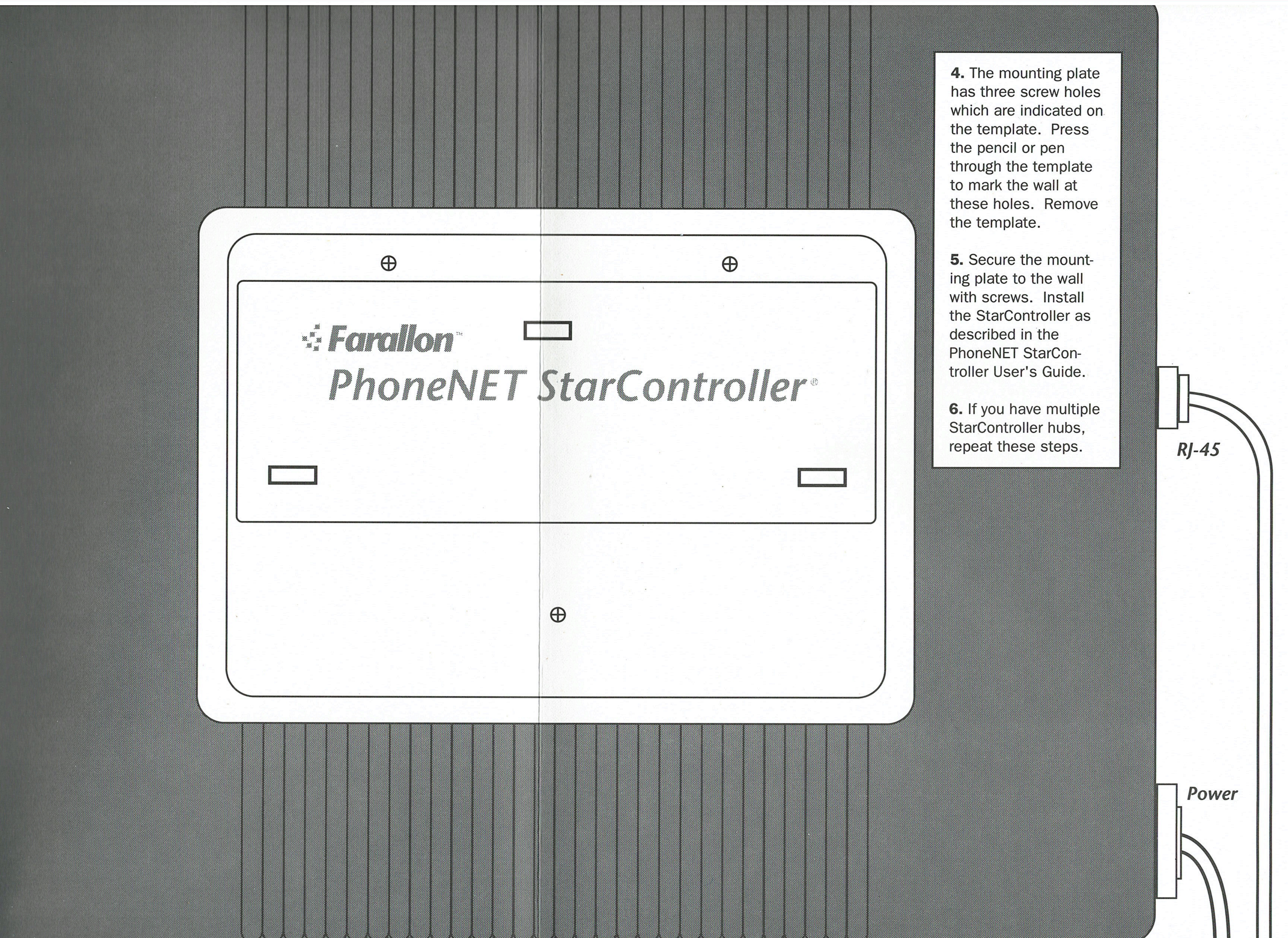

4. The mounting plate has three screw holes which are indicated on the template. Press the pencil or pen through the template to mark the wall at these holes. Remove the template.

5. Secure the mounting plate to the wall with screws. Install the StarController as described in the PhoneNET StarController User's Guide.

6. If you have multiple StarController hubs, repeat these steps.

The Last Word

Farallon Computing welcomes your comments and suggestions for this manual. Your input will help us improve the quality of future documentation. On the attached card, address any documentation issues of concern:

- Did you find any errors? Was the information clearly presented?
- Were the illustrations useful? Did you need more examples?
- If there was online help, did you use it?
- Did you need more information about any particular feature?
- What did you like most about this manual?

Feel free to send photocopied pages from this manual with your comments marked on them, or simply detach and mail this postage-paid card.

StarController User's Guide v. 592

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StarCommand™ 3.1 Release Notes

September 17, 1992

These additions and corrections include information that was not available prior to the printing of the *StarCommand 3.1 User's Guide.* We urge you to read them carefully, along with the StarCommand manual. These release notes are divided into the following sections:

- StarCommand 3.1 Tips
- Supplementary Files.

StarCommand 3.1 tips

These tips can help you to use StarCommand most effectively.

"Device not responding" vs. "Connection broken"

In the Session Event Log, you may occasionally see messages labelled "Device not responding" and "Connection broken." Although these messages may seem similar, they actually report two different situations.

> "**Device not responding**" means that StarCommand sent a message to the device, but did not receive a reply. When your network traffic is heavy, this message may appear in the Session Event Log at frequent intervals. This may indicate that StarCommand has not been able to poll the device successfully within a certain time period. The device itself may still be functioning normally. However, if you actually experience networking problems, you may wish to try resetting the device. To reset a device that is not responding to your StarCommand session, momentarily unplug the device from its power source, then reconnect it.
>
> "**Connection broken**" means that someone has changed the Communicate With Devices Via settings in the Set Preferences dialog box, or has physically broken a network connection, so that StarCommand is no longer able to communicate with the device over the search path it formerly used. To correct this condition, make sure that all network connections are intact. Then, if necessary, either change the Communicate With Devices Via settings to their former state, or close the StarCommand file and open a new one.

Window priority

StarCommand gives higher priority to the front-most window. Counters in a Port List or Info Window will update more quickly if you bring that window to the front.

Finding PN207 StarController hubs

StarCommand may take longer to find PN207 StarController® hubs than more recent hubs. StarCommand finds PN207 StarController hubs in ascending numerical order, starting at address 240, then 241, then 242, and so on up to 254. It then starts looking at address 1, then 2, and so on. You can reduce the time StarCommand takes to find PN207 StarController hubs by changing their addresses to the 240 to 254 range, or by using the Quick Find command from the Control menu.

Release note part number: 6120142-00-01
Four pages total

Printing from the Finder

If you attempt to print a StarCommand file from the Finder, StarCommand will open the file but will not begin printing. To print, select Print from the File menu and use the dialog box according to standard Macintosh procedures.

StarCommand, serial ports, and AppleTalk

When you launch StarCommand, the program checks the status of AppleTalk, the printer port, and the modem port on the Macintosh. The results of this check affect the Communicate With Devices Via options available in the Set Preferences dialog box. If AppleTalk is disabled in the Chooser, the AppleTalk option is dimmed. If the printer port or modem port is not available (as, for example, when the modem port is being used for telecommunications), the option for using StarCommand over that port is dimmed. StarCommand does not detect changes in availability made during a StarCommand session. If you wish to make a dimmed option available to StarCommand, you must quit StarCommand and re-launch after turning on AppleTalk or making the desired port available.

Existing StarCommand documents and their search paths

A StarCommand file bases its information storage and search practices on network data and preferences that are current when the file is created. If the information becomes obsolete, StarCommand may not operate properly with the file. Any of the following types of changes can make an existing StarCommand file obsolete:

- Transferring the StarCommand file from the Macintosh and network where it was created to a Macintosh on another network
- Disabling one of the Communicate With Devices Via options, in the Set Preferences dialog box
- Changing the location of a hub or router within your internetwork
- Reconfiguring a router to use a new network number.

When you use StarCommand with an obsolete file, any of the following symptoms may occur:

- Error messages may report that certain zones are missing.
- Some devices may not be found.
- StarCommand may treat some devices as password-protected, even if they are not password-protected.

If you need to make any of the changes listed above, open a new StarCommand file to ensure that all devices are displayed correctly.

Text strings composed only of spaces

If you press the Space bar while the cursor is in a StarCommand text box, but do not enter any other characters, StarCommand considers the spaces you entered to be a valid text string, rather than a blank. Using text strings composed of spaces can lead to confusing displays, particularly in the case of zone names.

Changing network connections while devices are resetting

Farallon recommends that you avoid changing network connections while resetting devices. When you reset a device, StarCommand displays a "Resetting" message for it in the Device List. If you physically break the network connection between your StarCommand session and the device that is resetting before the resetting process is complete, StarCommand will continue to display the "Resetting" message until you close the document and open a new one. This will also occur if you deselect a Communicate With Devices Via option while the device is resetting.

Autopartitioning alerts and statistics

You may find that more autopartitions are recorded in StarCommand statistics than are announced by an alert icon. The number shown in the statistics is correct. StarCommand does not display an alert if an autopartitioned port has been returned to service before StarCommand polls the device.

Running StarCommand on a PowerBook with an internal modem

You must disable the internal modem if you want StarCommand to communicate with Farallon hubs or routers via the Modem Port. To do this, open your Portable Control Panel and select External Modem.

Port Names, Network Numbers, and AppleTalk

In order to obtain complete repeater port information from an extended management device, StarCommand requires that an active AppleTalk connection to the device be present. If you have turned off AppleTalk in the Chooser, the Port List for an extended management device displays the word "Updating..." in the Port Name column, and Port Info windows for that device display no AppleTalk network information. To obtain repeater port information, quit StarCommand, connect the printer or modem port of your Macintosh to an AppleTalk network, turn on AppleTalk in the Chooser, and re-launch StarCommand.

Supplementary files

The following folders are included on the StarCommand User Support diskette:

- For PN357/377 Users—This folder contains a firmware program file called PN357/377 Firmware 1.2. This file contains code that is also stored in the currently shipping Farallon StarController hubs, PN357 and PN377. If you have any PN357 or PN377 hubs on your network with older firmware than version 1.2, you need to update them with the latest firmware. To check the version of the firmware currently installed on a PN357 or PN377, run StarCommand and open the Device Info window for the hub. The header will list the firmware version installed. If the version number is previous to 1.2, you need to reprogram the hub with the firmware on this diskette. You reprogram a StarController using the StarCommand Reprogram Device command, from the Control menu. With the new firmware, StarCommand finds PN357 and PN377 hubs much more quickly than with the old firmware.
- For PN657 Users—This folder contains a firmware program file called PN657 Firmware 1.0. This file contains the code that is stored in the currently shipping Farallon StarRouter™ (PN657). This file is identical to the firmware currently in all StarRouters; reprogramming with this file will not change StarRouter functionality in any way.
- For Concentrator Users—This folder contains a firmware program file called PN701 Firmware 1.0. This file contains the code that is stored in the Interface Module of the Farallon Concentrator (PN701). This file is identical to the firmware currently in all Interface Modules; reprogramming with this file will not change Interface Module functionality in any way.
- For StarCommand 2.2.1 Users—This folder contains a utility application called SC 2.2.1 File Converter. This application reads a StarInfo file created by StarCommand 2.2.1 and creates a new StarCommand 3.1 document out of it. It does not delete or change the original StarInfo file.
- For SNMP Users—This folder contains a Read Me file and two machine-readable ASCII MIB files. If you intend to use SNMP to manage a StarRouter, you must provide your SNMP management software with certain information about the StarRouter hardware and firmware. The two MIB files in this folder provide much of this information. The rest of the information is contained in four Internet-standard MIBs: RFC 1213, RFC 1229, RFC 1243, and RFC 1284, which are available to the public. For information on how to obtain these RFCs, see the StarRouter MIB Read Me file. For information on how to adapt your SNMP management software to manage the StarRouter, consult the documentation for your SNMP management software.
- Utilities—This folder contains Farallon's CheckNET™ utility, which you may find helpful for gathering information about your AppleTalk networks.